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BRITISH MEDICAL ASSOCIATION

SATURDAY MARCH 15 1941

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BRITISH MEDICAL JOURNAL

LONDON SATURDAY MARCH 15 1941

A NEW TYPE OF TYPHOID AND PARATYPHOID VACCINE

BY

A. FELIX, D.Sc.

(*From the Lister Institute and the Emergency Public Health Laboratory Service*)

Anti-typhoid inoculation is one of the old-established immunizing procedures introduced in the relatively early days of the bacteriological era. The original method of making typhoid vaccine (Wright and Semple, 1897; Pfeiffer and Kolle, 1896) has survived essentially unchanged up to the present time, and the type of vaccine still employed most extensively consists of a suspension of bacterial bodies which have been killed by heat and preserved by the addition of phenol. A great number of different methods have been described, both before and after the war of 1914–18, with a view to increasing the immunizing power of the vaccine and reducing the unpleasant systemic reactions which follow the administration of typhoid vaccines of the ordinary type. Some of these modified vaccines were suspensions of bacterial bodies killed by various chemicals instead of by heat, others were bacteria sensitized by treatment with homologous immune serum, while still other modifications consisted of bacterial extracts prepared in a great variety of ways (for references see Gay, 1918; Fleming and Petrie, 1934). These numerous types of typhoid vaccine were, however, all abandoned, since none of them was found to be superior to the ordinary vaccine made by the simple and time-honoured method of heat-killing and phenol-preservation.

Practical advances in anti-typhoid immunization, long delayed, have recently been made in quick succession as a result of our newer knowledge of the antigenic structure of the typhoid bacillus and of the different significance of different antibodies. Of the two typhoid antigens that were first differentiated the somatic O antigen is an important immunizing agent, while the flagellar H antigen is not (Felix, 1924; Arkwright, 1927; Topley, 1929; Schütze, 1930). Arkwright (1927), in an admirable discussion of the Army Council Report of the Anti-typhoid Committee (1912), showed that its main conclusions with regard to the preparation of typhoid vaccine were accounted for by the fact that the committee concentrated its attention almost entirely on one test as an index of immunity—namely, the measurement of the agglutinins produced by the inoculation of rabbits and man. The only typhoid agglutinin that could be estimated at that time was, however, the H agglutinin, and it is now known that the corresponding antigen is of little, if any, importance in the production of immunity.

Grinnell (1932) showed that the mouse is a suitable experimental animal for virulence and protection tests with the typhoid bacillus, and that the Rawlings strain—the classical laboratory strain used for more than thirty years in the preparation of typhoid vaccine in this and many other countries—had lost its immunizing capacity, although the cultures still possessed most of the commonly accepted criteria of smoothness. Perry, Findlay, and Bensted (1933a, 1933b, 1934a, 1934b) demonstrated in numerous experiments on mice that the degree of protection afforded by a typhoid vaccine was closely related to the virulence of the culture employed in its preparation. These workers also succeeded in "rejuvenating" the old Rawlings strain. It is now generally recognized that smooth mouse-virulent cultures of the typhoid bacillus possess the two antigenic constituents known as the O and the Vi antigens and that these are the essential elements which determine the immunizing capacity of typhoid vaccines (Felix and Pitt, 1934).

The balance of evidence obtained from active and passive protection experiments in mice indicates that the Vi antigen is the more effective prophylactic agent. At the same time reports have accumulated from various parts of the world showing that strains of the typhoid bacillus when freshly recovered from the blood culture invariably contain the Vi antigen, which, however, is gradually lost on subculture on ordinary media (Craigie and Brandon, 1936; Bensted, 1937, 1940). Earlier reports on the isolation from the blood of typhoid patients of strains devoid of the Vi antigen—for instance, that published by Felix, Krikorian, and Reitler (1935)—were probably incorrect and resulted from inadequate methods of growing and testing the cultures. It seems justifiable, therefore, to assume that the prophylactic value of typhoid vaccines has been greatly increased in recent years by the employment of selected strains which are particularly rich in the Vi antigen.

The Case for Changing the Old Method of Making Typhoid Vaccine

Why, then, it will be asked, should a new type of typhoid vaccine be suggested? It is perhaps not out of place to quote here two remarks from Gay's (1918) excellent monograph on typhoid fever: "It may well be questioned why further modification of typhoid vaccine

should seem necessary in view of the extremely good protective results that have already been obtained in certain large groups of individuals. . . . The only answer to such questions is and must ever remain that theoretical considerations based on the understanding of underlying principles will ever precede all practical advances" (p. 163). There can be little doubt that present-day methods of anti-typhoid immunization do not yet afford protection of a degree comparable to the immunity acquired by recovery from the disease. Gay's remarks seem to be as much to the point now as they were at the time they were written, nearly a generation ago.

The available knowledge of the properties of the Vi antigen clearly indicates that it is a remarkably labile substance which suffers very considerable damage by the treatment to which it is subjected in the customary processes of making typhoid vaccine. Sera from rabbits or horses immunized with suspensions of Vi strains sterilized by heating to 58° C. or by 0.5% phenol contain either no Vi antibody or only negligible amounts of it. Such sera are much less effective in protecting mice against virulent O + Vi bacilli than are sera which have been prepared by immunization with living bacilli and contain demonstrable Vi antibody. Treatment with formalin, such as that employed in the preparation of Grasset's (1939) "endotoxoid" vaccine or the mixture of T.A.B. vaccine and tetanus toxoid suggested by Ramon (1939) and Maclean and Holt (1940), so alters the Vi antigen that the resulting antibody exhibits a peculiar "functional deficiency," which is characterized by a reduced power of promoting phagocytosis and of protecting mice passively against infection with virulent strains of the typhoid bacillus (Felix and Bhatnagar, 1935). On the other hand, alcohol-treated suspensions stimulate in the rabbit or the horse the production of a Vi antibody which possesses the full functional efficacy of the antibody induced by immunization with the "natural" Vi antigen in living Vi strains (Felix and Petrie, 1938).

When mice are actively immunized, instead of passively protected by the injection of immune serum, the results are entirely different. In mice, vaccines sterilized in different ways induce an active immunity against infection with a virulent strain so long as cultures containing the Vi antigen are employed in the preparation of the vaccine. Schütze (1936) compared ten different methods of sterilization, including the standard method of heating to 53° C. for seventy minutes with the subsequent addition of 0.5% phenol, and found all of them of equal value in the active immunization of mice. Other workers have recorded similar results, and active-protection tests in mice are now employed in most laboratories as the sole method of assessing the protective value of typhoid vaccines. The demonstration of circulating antibodies in a suitable animal or in man, by using the serum to passively immunize mice, is not generally held to indicate the real protective value of a vaccine, and most workers discard it as unnecessary, though this technique appears to me to be of fundamental importance. The position is reminiscent of that already referred to when, in the early days of typhoid vaccination, agglutination tests were used as the sole criterion of immunity response, to the exclusion of the other suggested tests which were more difficult to perform, such as the estimation of the lytic or opsonizing power of the serum, or protection tests in the guinea-pig.

It is recognized that active antibacterial immunity depends mainly on the increased power of the tissues to elaborate specific antibodies rapidly when infection occurs, and the titre of the circulating antibodies that is found in the individual animal or man before the stimulus of infection occurs is not a reliable measure of this power. To that extent it is probably correct to state that active antibacterial immunity is independent of circulating antibodies. It is, however, equally well established that both the increased cellular reactivity and the circulating antibody owe their existence to the specific stimulus of the same substance—namely, the specific bacterial antigen. Thus it is also correct to state that in order to induce good active immunity the vaccine used must contain the specific antigen in that form which most effectively stimulates the increase of both cellular reactivity and the circulating antibody. Recovery from the disease, it is known, produces both these signs of immunity response.

It has been mentioned already that the active immunity experiments in mice do not disclose those great differences in the antigenic value of various preparations of the Vi antigen which are so clearly demonstrated by using the serum of vaccinated rabbits or horses in passive-protection experiments with mice or even by *in vitro* laboratory tests. This may perhaps be due to the fact that the typhoid bacillus is not a natural pathogen of the mouse. The customary anti-immunity test in the mouse therefore does not represent a sufficiently sensitive method of testing different preparations of typhoid antigens, and certainly should not be accepted as the sole test. It is obvious that in comparative tests of this kind all available methods should be employed in order to detect how far the immunizing properties of the various vaccines have been preserved or impaired. At present the position seems to be unsatisfactory, since the greatest care is taken to include in the vaccine only cultures that are particularly rich in the Vi antigen but very little is done to ascertain that this substance is being preserved in its most efficient form.

Methods of Assaying the Protective Value of Different Types of Typhoid Vaccine

Three distinct methods are available for carrying out comparative tests of different types of typhoid vaccine, as follows: (1) Active immunization of mice. (2) Immunization of rabbits with a view to establishing: (*a*) whether circulating Vi and O antibodies are readily elaborated; (*b*) whether the Vi antibody produced possesses full functional efficacy or belongs to the variety which is deficient in opsonizing and protecting power. (3) Tests of the Vi and O antibody responses in man.

Technical details cannot be discussed here. The tests are essentially identical with those employed in the estimation of the potency of therapeutic anti-typhoid sera, and have been described in detail (Felix, 1938). A few remarks only need be made concerning the practical application of the various tests.

1. Active immunization of mice is the least sensitive test. A vaccine that has been found to be of low protective value in this test should be condemned, and need not be further examined.

2*a*. The antibody response in the rabbit is estimated by Vi and O agglutination tests. It has been shown, in work already referred to, that in sera prepared against living Vi bacilli the Vi agglutinin titre runs approximately parallel with the protective power against living virulent bacilli, while the O agglutinin titre in all sera that contain the O antibody runs, on the whole, parallel with the protective power against the toxic action of killed typhoid bacilli. Thus the two agglutinin titres provide a trustworthy measure of the protective activities of the two antibodies, and the complicated protection tests can be safely replaced by the relatively simple agglutination reaction.

2*b*. The functional efficacy of the Vi antibody is examined in passive-protection tests in mice or in phagocytosis experiments (Felix and Bhatnagar, 1935).

3. A vaccine that has successfully passed the tests specified under paragraphs 1 and 2 should be submitted to the final

test of its capacity to induce the formation of Vi and O agglutinins in man.

So far this more severe method of assaying the efficacy of typhoid vaccines by tests in the mouse, the rabbit, and man has not been adopted by the majority of the workers engaged in the preparation of typhoid and paratyphoid vaccines. Rainsford (1937, 1939) experimented with typhoid vaccines sterilized by silver nitrate or sodium merthiolate and tested them in the manner outlined here. His experiments, however, were interrupted by the outbreak of the war before reaching the final stage of testing the efficacy of the vaccines in the inoculated human subject.

Experiments with Alcohol-killed Typhoid Vaccine

As soon as it was found that alcohol-killed typhoid bacilli stimulated in the rabbit abundant Vi antibody of full protecting and opsonizing power (Felix and Pitt, 1936; Felix and Petrie, 1938) an experiment was arranged to test for antibody response to such vaccine in the inoculated human subject. With the kind co-operation of Dr. W. D. Nicol, medical superintendent of the Horton Mental Hospital, 50 female mental patients were given three doses of the vaccine by the subcutaneous route, and another group received large doses of the same vaccine by the mouth. Samples of blood were taken in each case before the first dose and again eighteen days after the third dose, and the sera were examined in parallel by agglutination tests, using as reagents the same batch of agglutinable suspensions. Any rise in agglutinin titre corresponding to an increase of 100% or more was taken as "significant." The results of the O and Vi agglutination tests are summarized in Table I.

TABLE I.—*Percentage of Cases showing a Significant Increase in O and Vi Agglutinins after Immunization with Alcohol-killed Typhoid Vaccine containing no Preservative*

	No. of Organisms in Dose	No. of Immunized Persons in Group	Percentage Frequencies of Significant Increase in Titres	
			O	Vi
Subcutaneous inoculation	1st dose, $2{,}000 \times 10^6$ 2nd ,, $3{,}000 \times 10^6$ 3rd ,, $3{,}000 \times 10^6$	50	98.0	48.0
Oral administration	1st dose, $60{,}000 \times 10^6$ 2nd ,, $80{,}000 \times 10^6$ 3rd ,, $80{,}000 \times 10^6$	44	31.9	4.5

It is seen from the table that the results obtained were very encouraging indeed, since the subcutaneous inoculation of the vaccine had induced a detectable rise in O antibodies in nearly all and of Vi antibodies in nearly half the inoculated. Though the doses were larger than those employed in the customary T.A.B. inoculation the reactions following the alcohol-killed vaccine seemed to be much less severe. The table also shows that the oral administration of very large amounts of the vaccine, which was given on the empty stomach in the form of a saline suspension without the addition of bile, only led to very feeble stimulation of either the O or the Vi antibody.

The vaccine used in this experiment did not contain any preservative. The bacilli were killed by treatment with 75% alcohol; the latter was then removed by centrifuging and washing with saline, and the bacillary bodies were made up to the required opacity with saline alone. However, re-examination of samples of this vaccine after storage for half a year in the cold room, in saline alone or with the addition of 0.5% phenol or 0.35% tricresol, gave the disappointing result that each of the samples had almost entirely lost the capacity of stimulating formation of Vi antibody in the rabbit, though O antibody invariably was produced to high titre. This alcohol-killed vaccine could therefore not be recommended for use in large-scale inoculations, since a vaccine must contain a preservative capable of protecting it from casual contamination. Freshly prepared alcohol-killed vaccine containing no preservative was, however, employed during the past few years for the immunization of those amongst the personnel of the Lister Institute who were often handling virulent typhoid bacilli, and the impression gained in the course of time was that the reactions following the inoculations were less severe than those produced by the customary heat-killed and phenol-preserved vaccine. The experiments referred to were not published, but were recorded in the Annual Report of the Lister Institute for 1937.

Alcohol as a Preservative of Typhoid Vaccine

During the present war experiments with the alcohol-killed vaccine were continued, and the suggestion was made by Prof. G. S. Wilson of the Emergency Public Health Laboratory, Oxford, that alcohol might serve not only for the sterilization of the vaccine but possibly also for its preservation. This suggestion was soon found to be most valuable.

Long experience of alcohol-killed suspensions of the typhoid bacillus had proved beyond any doubt that a solution containing 75% absolute alcohol and 25% normal saline was a most reliable bactericidal agent. Large quantities of typhoid vaccine sterilized in this way and suspended in saline had been employed during the past few years for the immunization of horses in the course of the preparation of therapeutic anti-typhoid serum (Felix and Petrie, 1938), and in no instance did sterility tests on the numerous batches of vaccine prepared disclose the survival of either typhoid bacilli or other organisms.

The disinfectant action of alcohol was now compared with that of 0.5% phenol, using *Staphylococcus aureus* as the test organism. The comparative tests, which need not be described here in detail, were conducted both in saline alone and in saline containing 2,500 millions of alcohol-killed T.A.B. bacteria per c.cm. The clear-cut result was that the disinfectant action on *Staph. aureus* of 25% alcohol was slightly stronger than that of 0.5% phenol, while that of 20% alcohol was slightly weaker.

Next the effect of the subcutaneous injection of saline containing 25 or 30% alcohol was tried out on me and on a few volunteers. The injections of 0.5 or 1 c.cm. of these solutions were felt as a sting lasting for a fraction of a minute, but did not cause any local or general reaction. It was therefore decided that 25 or 22.5% alcohol could be employed as a suitable preservative of typhoid vaccine.

Batches of T.A.B. and T.A.B.C.* vaccine were prepared for experiments in rabbits and for comparative trials in human subjects. Two different vaccines were made in each case, both equivalent in composition and total bacterial count to the customary T.A.B. or T.A.B.C. vaccine—i.e., 2,500 million organisms per c.cm.—but prepared by one of the following two methods: (*a*) sterilized by treatment with 75% alcohol and preserved in saline containing 25% alcohol; (*b*) sterilized by treatment with 75% alcohol, washed on the centrifuge with saline, and preserved in saline containing 0.5% phenol. At the same time a quantity of the alcohol-killed typhoid suspension that served as one of the components of the mixed vaccines was retained for further experiments in

* Under the Therapeutic Substances Regulations the denomination T.A.B.C. now signifies in this country a vaccine containing typhoid bacilli along with paratyphoid bacilli of Types A, B, and C, and not, as previously, a vaccine containing typhoid bacilli and paratyphoid bacilli of Types A and B plus the vibrio of cholera; this latter vaccine is now known as T.A.B. + cholera.

rabbits, divided into five equal portions, and suspended in: (1) saline, (2) saline + 0.5% phenol, (3) saline + 25% alcohol, (4) saline + 30% alcohol, and (5) saline + 50% alcohol. All the vaccines were stored in the cold room at 1° to 2° C. and were tested for antibody response in rabbits and in human subjects after various intervals of time. The comparative trials in man are described in a paper by Felix, Rainsford, and Stokes that will appear in the next issue of the *Journal*. The experiments in rabbits are summarized in Tables II and III.

TABLE II.—*Typhoid Vi Antibody Response in Rabbits Immunized with T.A.B. and T.A.B.C. Vaccines*

Vaccines Sterilized with Alcohol			No. of Rabbits in Group	No. of Rabbits Showing Significant Increase in Vi Agglutinin Titre				Average Vi Agglutinin Titre after First and Second Intravenous Injections
				After Subcutaneous Injection of		After Intravenous Injection of		
Batch	Stored at 1° to 2° C. for	Preserved with		0.5 c.cm.	1 c.cm.	1 c.cm.	2 c.cm.	
T.A.B.	4 months	Phenol	3	0	0	0	0	
		Alcohol	3	0	0	3	3	1 : 20
T.A.B.C.	1 month	Phenol	3	0	0	1	1	1 : 3
		Alcohol	3	0	0	2	2	1 : 7

Table II shows that one of the alcohol-killed vaccines that had been preserved with phenol failed to stimulate Vi agglutinin, while the other induced formation of Vi agglutinin in only one out of three rabbits, whereas the two alcohol-preserved vaccines did so in five out of six. It is seen from the table that Vi antibody was in no instance demonstrable after the two subcutaneous injections, but made its appearance only after intravenous injection of a dose identical with the maximum dose that is employed in the customary subcutaneous inoculation of adult men, making no allowance for the difference in body weight. This fact is noteworthy in view of the results—discussed in the subsequent paper—which were obtained in human subjects inoculated with these four batches of vaccine. On the other hand none of the twelve rabbits failed to show a significant rise in the typhoid O agglutinin even after the first subcutaneous dose. At each stage during the immunization of the rabbits the average typhoid O titres were much the same in the four groups—namely, about 1 in 500 after the first subcutaneous injection, about 1 in 1,000 after the second subcutaneous injection, and about 1 in 5,000 after the first intravenous injection. In this and the following experiment the rabbits were inoculated at weekly intervals and the samples of blood were taken on the seventh day following each immunizing injection. The degrees of agglutination that have been employed to indicate the O and Vi titres respectively were identical with those used in the examination of the sera from inoculated human subjects, and are defined in the subsequent paper.

TABLE III.—*Vi Antibody Response in Rabbits Immunized with Variously Preserved Typhoid Vaccines*

Alcohol-killed Typhoid Vaccine Stored for 9 Months at 1° to 2° C., Suspended in	No. of Rabbits in Group	No. of Rabbits Showing a Significant Increase in Vi Agglutinin Titre after Intravenous Injection of		Average Vi Agglutinin Titre after Intravenous Injection of	
		500×10^6 Organisms	$1,000 \times 10^6$ Organisms	500×10^6 Organisms	$1,000 \times 10^6$ Organisms
Saline	4	2	2	1 : 4	1 : 10
Saline + 0.5% phenol	4	1	1	1 : 2.5	1 : 2.5
Saline + 25% alcohol	4	4	4	1 : 20	1 : 80
Saline + 30% alcohol	4	4	4	1 : 10	1 : 50
Saline + 50% alcohol	4	4	4	1 : 35	1 : 90

Table III corroborates the observation, already referred to, that the capacity of the alcohol-killed vaccine to stimulate Vi antibody formation deteriorates on storage in saline with or without the addition of 0.5% phenol. At the same time the table clearly demonstrates that the presence of alcohol in the vaccine prevents this deterioration taking place for at least nine months, and probably for much longer. It is also seen that 25% alcohol seems to be as effective in this respect as the two higher concentrations tested, though the latter conclusion may have to be modified after observation over a longer period of time. Again, there was no significant difference in the O antibody response to the five different vaccines. Each of the twenty rabbits produced abundant O antibody, and the average titres in the five groups were of the same order—about 1 in 5,000 after the second dose of vaccine.

The Vi Antigens of Bact. paratyphosum A, B, and C

A few remarks must be made here on the other three constituents of the mixed typhoid and paratyphoid vaccine. Some time ago *Bact. paratyphosum* A and B were found to possess specific Vi antigens of their own (Felix and Pitt, 1936), while *Bact. paratyphosum* C contains a certain amount of the specific Vi antigen of the typhoid bacillus (Kauffmann, 1935). So far most workers have paid very little attention to these findings, because the presence of these antigens in cultures of paratyphoid A, B, and C bacilli has much less striking effects on their virulence, agglutinability, and immunizing properties than the typhoid Vi antigen has on the typhoid bacillus.

Experiments carried out in collaboration with Miss R. M. Pitt before the war, but not yet published, strongly suggest that the heat-labile somatic antigens of paratyphoid A and B bacilli have chemical properties essentially similar to those of the typhoid Vi antigen, though they differ from the latter in certain respects. These antigenic components must therefore be recognized as separate and distinct entities, quite different from the heat-stable somatic O antigens of paratyphoid A and B bacteria. In experiments on passive immunization of mice pure Vi serum has a powerful protective action against virulent paratyphoid B bacilli, and the same is probably the case with paratyphoid A bacilli, though experimental evidence on this point has not yet been published.

From this brief summary of the experimental data three conclusions of practical importance in the preparation of T.A.B. or T.A.B.C. vaccine seem to be quite obvious: (*a*) The cultures of paratyphoid A and B bacilli to be included in the vaccine should contain maximum amounts of both the O and the Vi antigen. (*b*) Treatment with alcohol, instead of with heat and phenol, is likely to enhance the protective power of the vaccine against infection with paratyphoid A or B bacilli, though the advantage may not be of the same magnitude as it is in the case of the typhoid bacillus, since heat-killed or phenolized suspensions of paratyphoid A or B bacilli do stimulate circulating Vi antibodies in the rabbit. (*c*) If, for special reasons, paratyphoid C bacteria also are included in the vaccine, further advantage is gained by selecting a strain which possesses the specific Vi antigen of the typhoid bacillus and by treating it with alcohol.

Technique employed for the Preparation of Alcohol-killed and Alcohol-preserved Vaccine

This technique is very simple indeed. The growth on plain agar from Roux bottles of the usual size is washed off with 20 c.cm. of sterile saline per Roux bottle, the suspensions are collected in flasks containing glass beads, and a count or estimation by opacity is made. The growth from one Roux bottle, 8½ in. by 4½ in., usually yields about 1,500,000 × 10^6 organisms of the typhoid

and paratyphoid strains employed, varying according to the quality of the agar medium. Absolute alcohol is added to the suspensions in the proportion of 60 c.cm. of absolute alcohol to 20 c.cm. of saline. The flasks, which now contain the bacterial suspensions in 75% alcohol, are kept for two days at room temperature in the dark and are repeatedly shaken during that time.

The time required for the sterilization of the suspensions is very short—probably to be measured in minutes rather than in hours—nevertheless it is advisable to prolong the treatment for forty-eight hours and to ensure very thorough shaking. It is well known that absolute alcohol is a very poor disinfectant, and it might be feared that some contaminants, especially spore-bearing organisms, might gain access to the suspensions with the alcohol. It has been mentioned already that treatment with 75% alcohol for forty-eight hours at room temperature has invariably accomplished sterilization of each batch of vaccine that has been prepared up to the present time, without previous sterilization of the commercial absolute alcohol.

On the morning of the second day of the treatment with 75% alcohol the supernatants are decanted or sucked off, and the sediments are resuspended in the same quantities of fresh 75% alcohol and allowed to stand for some hours, until the bacteria have settled down completely. The solution of 75% alcohol + 25% saline to be used for this purpose should be prepared at least two days in advance and kept at room temperature, to ensure sterilization of the commercial absolute alcohol. The second supernatants are then sucked off as completely as possible. This procedure removes from the suspensions most of the constituents, mainly broth, which may have been collected from the agar medium together with the bacterial growth.

The deposits now consist of about a tenth to a fifth of their volume of solid bacteria and the remaining part of 75% alcohol. The amount of alcohol present in the deposits is estimated approximately and an appropriate adjustment is made while the dilute alcohol is being prepared, so that the deposits are finally suspended in saline containing 22.5% alcohol. This dilute alcohol should be prepared from a stock dilution of 75% alcohol which has been stored at room temperature for not less than two days. The suspensions of the three or four strains that are to be incorporated in the vaccine are then tested for sterility and again counted by opacity or some other method, and the final product is made by mixing the calculated quantities of the various suspensions and further diluting with 22.5% alcohol.

Attention must be paid to the fact that suspensions of alcohol-killed typhoid or paratyphoid bacteria have an opacity considerably less than that of suspensions equivalent in number of bacteria but killed by heat and preserved with phenol. The difference in opacity is about 10 to 20%, and is accounted for partly by the destruction of the flagella and partly by some alteration in the physical condition of the surface of the bacteria.

The methods used for the selection of the most suitable strains and the preservation and maintenance of the cultures have been described in detail in previous papers. Freshly isolated strains of typhoid and paratyphoid bacilli are not necessarily the best source of the antigens that are essential in the make-up of a potent vaccine. Though many strains at the time of their isolation are highly virulent and possess the Vi antigen in maximum amount, only few have the ability to maintain it at a high level when subcultured on artificial media. The strains employed in the present experiments—*Bact. typhosum* strain Ty 2, *Bact. paratyphosum* A strain HA 6, *Bact. paratyphosum* B strain HB 3, *Bact. paratyphosum* C strain K 32 (Kauffmann)—are all known from earlier work, and the first three strains have been chosen for their outstanding ability to produce Vi antigen in maximum amount when grown on plain agar for periods of many years.

The routine examination of the cultures consists of agglutination tests alone, using pure O and pure Vi sera. Occasionally the precaution is taken to check the results by virulence tests in the mouse. Bensted (1937), who has had much experience of such tests, found that the estimation of the Vi content of typhoid cultures by agglutination tests was often a more accurate guide in observing slight differences in virulence than the actual mouse test itself, unless large numbers of animals were employed.

The important discovery made by Craigie and Yen (1938) of type-specific typhoid Vi phages also must be mentioned in connexion with the problem of selecting the typhoid strain or strains for inclusion in the vaccine. It is known that by means of these phages Craigie succeeded in dividing typhoid strains from different sources into a number of different types. In view of the striking stability of these phage types it was considered necessary to investigate whether serological differences could be detected in the Vi antigen of typhoid strains belonging to different phage types. The experiments included cross-agglutination and cross-absorption tests, and phagocytosis and passive-protection tests in mice, and were completed in collaboration with Miss R. M. Pitt before the war but are not yet published. No difference between the actions of homologous or heterologous phage-type sera could be disclosed by any of these methods, and it appears to be safe to continue employing a single strain of the typhoid bacillus for making typhoid vaccine.

Summary

Ordinary typhoid-paratyphoid vaccine killed by heat and preserved with phenol stimulates in the rabbit and in man only negligible amounts of demonstrable typhoid Vi antibody.

Alcohol-killed vaccine readily stimulates circulating typhoid Vi antibody when injected intravenously into the rabbit, and induces its formation in nearly 50% of human beings after subcutaneous inoculation. This Vi antibody possesses its full opsonizing and protecting power.

Alcohol-preserved vaccine still contains typhoid Vi antigen in its effective form after storage in the cold for at least nine months, and probably much longer.

The technique of the preparation of alcohol-killed and alcohol-preserved T.A.B.C. vaccine is described.

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HEPATOTROPHIC AND CARDIOTROPHIC PROPERTIES OF SEX HORMONES

BY

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In earlier papers by Korenchevsky and co-workers (1933–40) the manifold effects produced by sex hormones on the non-sex organs have been repeatedly emphasized on the basis of (1) the changes in weight of the organs of gonadectomized rats as compared with those of normal intact animals; (2) the changes in weight of the organs of rats injected with various sex hormones as compared with those of uninjected litter-mates. The microscopical changes produced in some of the non-sex organs of the rats described in these papers have been examined, and the literature on the subject reviewed in the case of adrenals of males and females (Hall and Korenchevsky, 1938b; Hall, 1940), liver of males (Hall and Korenchevsky, 1938a), and kidneys of both sexes (Korenchevsky and Ross, 1940).

In the present paper the weights of the liver and heart of 281 male and 503 female rats from all our experiments, published and unpublished, have been divided into three series according to age and duration of hormone administration, and the data from each series have been pooled and statistically analysed. The other methods of examination of the organs are given below. In the experiments on females special attention has been paid to two male hormones, androsterone and transdehydroandrosterone, since both are naturally present in the female organism (Callow, 1936; Callow and Callow, 1938); and in the experiments on males to the effects of oestrogens, since large quantities of oestrone have been found in male urine (Häussler, 1934; Deulofeu and Ferrari, 1934, 1935; Zondek, 1934; Cartland, Meyer, Miller, and Rutz, 1935; Girard, 1938), and oestrone and oestradiol have been isolated in the pure form and in large quantities from the testes (Beall, 1940).

Technique

The general technique has been described in previous papers. The male rats have been grouped as follows: Series I and II (Table I) include experiments of 20 to 24 days' (in most cases 21 days') duration on rats aged 71 to 100 days (Series I) and 101 to 150 days (Series II). Series III refers to rats 137 to 177 days old injected with sex hormones for a longer period, varying from two to four, mostly three, months. Series I to III of the experiments on female rats (Table II) correspond in length of treatment to those on males, but the ages of the animals were 60 to 85 days (Series I), 86 to 125 (Series II), and 110 to 214 days, mostly about 150 days (Series III). The following hormones were used in the doses stated (mg. per week):

	Series I and II	Series III
Male Hormones		
Androsterone	6.3–25.2	7.5
Androstanediol	2.45–25.2	—
Transdehydroandrosterone	7.0–28.0	7.5
Testosterone pure	1.17–10.5	0.75–7.5
Testosterone P (propionate)	1.17–10.5	0.75–7.5
Testosterone D (dipropionate)	1.05–10.5	7.5
Δ^4-androstenedione	3.5–21.0	—
Female Hormones		
Oestrone	0.014–0.024	—
Oestradiol D (dipropionate) or BB (3-benzoate-17-*n*-butyrate)	0.018–0.09	0.018–0.2

In the tables a particular male or female hormone or a special dose is noted only when this hormone or dose had a considerably different effect on the liver or heart; the doses given in the tables are in mg. per week.

Sections were stained with haematoxylin and eosin and, when necessary, Masson's trichromic stain and scharlach red, and the usual microscopical investigation was made. In addition, in order to compare the size of the liver cells, the same technique of counting the number of cells in an area of known size with the aid of a camera lucida was used as in our previous paper (Hall and Korenchevsky, 1938a). In the present paper the cells were counted at a lower magnification than in the previous one; in this way a larger number of cells were contained in the measured area, which, it was felt, would lead to greater accuracy in the results. In Series I and II, Table I, the data for the number of cells are taken from our previous paper and multiplied by 2 in order to make them comparable to the figures of Series III.

In order to measure the heart-muscle fibres a technique was used similar to that described in our paper on kidneys (Korenchevsky and Ross, 1940). Longitudinal fibres were outlined on a measured area of paper (7.5 × 12.5 cm.), which had been previously weighed; the intermuscular spaces were then cut away, and the paper replicas of the fibres thus obtained were weighed. This weight was corrected to a standard weight of the paper, since different sheets and even different parts of the same sheet were found to vary in weight. Five areas from each heart were drawn and weighed in this way, and the average obtained represented the measurement of the muscle fibres. These measurements of liver cells were made in about a half, and of heart fibres in about one-third, of the total number of rats.

The technique used on the isolated hearts of rats will be described in detail elsewhere.

Statistical Treatment of the Results.—The data presented in the tables which follow were analysed by one of us (J. Cohen) by means of Fisher's t-test (Fisher, 1936). For the sake of simplicity the statistical significance (abbreviated "S.S.") is briefly given in the appropriate places in brackets. Thus "(S.S. 1:100)," for example, means that the observed difference between the means of two groups could occur by chance less than once in 100 such experiments. Not all the differences attain the same level of significance. The majority by far would have occurred less than once in 100 cases in random sampling. Many, however, would have occurred less than once in 1,000 or even 5,000 cases. All the instances where the statistical significance reaches or exceeds the level of 1 per 1,000 (by chance) are expressed as "S.S. 1:1,000."

Changes in Body Weight and Fat Deposition.—These changes are given in Tables I and II. They will not be discussed in detail here, but as they might have a considerable effect on the changes in weight and size of the organs they will be referred to, when necessary, in order to understand the mechanism of the weight changes in the liver and heart.

Effect of Gonadectomy

It is necessary to remember that in general, as compared with normal controls, castrated rats become lighter (S.S. 1:100) and ovariectomized rats heavier (S.S. 1:100–1,000), the changes usually becoming most clear during the later periods after gonadectomy, when there is also a tendency in most animals to increased fat deposition.

The liver in males becomes lighter both in actual weight (S.S. 1:100–1,000) and per unit of body weight (S.S. 1:20–1,000), whereas in females only the latter weight decreases (Series II and III, S.S. 1:1,000), the actual weight remaining unchanged or even slightly increasing. It is

* Dr. Korenchevsky desires to express to Oxford University, to Prof. E. S. Goodrich, and to Prof. J. A. Gunn his own and the Lister Institute's gratitude for the kind hospitality extended to him and his co-workers in the Department of Zoology and Comparative Anatomy and the Nuffield Institute for Medical Research.

TABLE I.—*Effect of Sex Hormones on Body Weight, Retroperitoneal Fat, Liver, and Heart of Male Rats*

No. of Series	Group of Rats	No. of Rats	Final Body Weight (gm.)	Weight of Retroperitoneal Fat (gm.)		Liver			Heart		
						Weight (gm.)			Weight (mg.)		
				Actual	Per 200 gm. of Body Weight	Actual	Per 200 gm. of Body Weight	No. of Cells*	Actua	Per 200 gm. of Body Weigh	Paper Replicas of One Muscle Fibre†
I	1. Normal controls	26	325	12	7	12.25	7.56	} 114	911	563	—
II	2. ,, ,, ...	14	380	12	6	13.48	7.14		1,027	549	—
III	3. ,, ,, ...	14	436	16	7	12.98	5.95	107	1,136	522	28
I	4. Castrated controls	33	297	12	8	10.17	6.59	} 112	829	557	—
II	5. ,, ,, ...	25	327	13	8	9.72	5.93		865	529	—
III	6. ,, ,, ...	13	377	18	9	10.42	5.51	119	934	496	22
	Castrated rats injected with:										
III	7. Oestradiol D	10	246	10	8	9.41	7.62	129	847	694	23
I	8. Male hormones	71	315	12	8	12.28	7.77	} 142	938	593	—
II	9. ,, ,, ...	14	330	12	7	11.65	7.09		991	603	—
III	10. ,, ,, (weak doses or hormones)	15	398	17	9	12.74	6.40	112	1,115	561	24
III	11. ,, ,, (large dose of testosterone P)	7	335	9	5	11.15	6.64	111	1,127	673	26
I	12. ,, ,, +oestrone	16	280	10	7	9.52	6.84	124	825	'91	—
III	13. ,, ,, +small dose of oestradiol D	11	313	13	8	11.42	7.32	124	976	628	22
III	14. ,, ,, +large dose of oestradiol D	12	240	7	6	8.69	7.27	135	822	690	23

* The greater the number of cells in the measured area the smaller they are, and vice versa. † The heavier the replicas, the larger the muscle fibres.

TABLE II.—*Effect of Sex Hormones on Body Weight, Abdominal Fat, Liver, and Heart of Female Rats*

No. of Series	Group of Rats	No. of Rats	Final Body Weight (gm.)	Weight of Abdominal Fat (gm.)		Liver			Heart		
						Weight (gm.)			Weight (mg.)		
				Actual	Per 200 gm. of Body Weight	Actual	Per 200 gm. of Body Weight	No. of Cells	Actua	Per 200 gm. of Body Weigh	Paper Replicas of One Muscle Fibre
I	1. Normal controls	30	202	10	10	7.84	7.81	—	677	670	—
II	2. ,, ,, ...	10	232	18	15	8.25	7.15	—	726	628	—
III	3. ,, ,, ...	17	254	18	14	8.39	6.51	123	765	594	21
I	4. Spayed controls	45	237	12	10	8.77	7.50	—	718	619	—
II	5. ,, ,, ...	24	264	16	12	8.04	6.15	—	734	561	—
III	6. ,, ,, ...	17	328	23	14	9.23	5.63	126	799	492	21
	Spayed rats injected with:										
I	7. Oestrone	31	188	8	8	7.05	7.54	—	609	650	—
II	8. ,, ...	12	248	16	13	7.46	6.04	—	723	589	—
I	9. Oestradiol D 0.018	13	207	7	6	9.03	8.77	—	747	726	—
II	10. ,, ,, ...	9	228	10	9	8.73	7.66	—	755	669	—
III	11. ,, D or BB 0.018–0.09 ..	24	245	14	11	8.25	6.79	131	805	653	22
III	12. ,, D 0.2	9	188	6	7	6.71	7.18	145	596	641	20
II	13. ,, D or BB 0.018+rest 10–52 days	16	274	15	11	10.69	7.82	110	844	620	20
I	14. Male hormones	44	228	10	9	9.94	8.80	—	725	635	—
II	15. ,, ,, ...	6	252	—	—	9.63	7.68	—	720	574	—
III	16. Androsterone 7.5	4	339	20	12	11.39	6.75	120	928	548	24
III	17. Transdehydroandrosterone 7.5 ..	4	308	19	12	9.81	6.36	120	768	499	21
III	18. Testosterone P 2.25	7	314	18	11	10.42	6.65	119	935	597	22
III	19. ,, P or D 7.5	10	278	11	8	10.75	7.77	111	970	701	23
I	20. Male hormones+oestrone	54	204	7	7	8.32	8.18	—	671	662	—
II	21. ,, ,, ,, ...	19	263	16	12	8.46	6.47	—	767	589	—
III	22. Androsterone 7.5 + oestradiol D 0.018–0.09	14	269	14	10	9.83	7.32	131	913	670	22
III	23. Testosterone P or D+oestradiol D or BB 0.018–0.09	19	263	12	9	9.00	6.87	141	916	698	21
III	24. Testosterone P+oestradiol D 0.2 ..	15	213	8	7	7.80	7.39	132	627	593	21

thus clear that in males castration has a depressing effect on the development of the liver. There are, however, no great histological changes in the liver in either sex. The size of the cells is unchanged or (Series III) only slightly decreased. In several cases there is an increase, sometimes considerable, in the vacuolation of the cells and the content of lipoid granules.

Similar changes occur in the weight of the *heart*, but they are much less pronounced: in males the actual weight becomes significantly smaller (S.S. 1:100), in females only the relative weight (S.S. 1:1,000, in the later periods after ovariectomy). Histologically no definite changes in the structure of the heart were found, except, on the average, a slight decrease in the size of the muscle fibres in males.

Effect of Oestrogens

This was similar in both sexes. The depressing effect of oestrogens on growth and body weight has been shown by several workers, including ourselves, in our previous and present papers (in the present series S.S. 1:50–1,000 in experiments of short duration, 1:100 in those of long duration). In most cases there was also a depressing effect on fat deposition (S.S. 1:20–1,000).

The effect on the actual weight of the *liver* was not uniform or definite except with large doses injected for long periods (Table II, Group 12), in which case a considerable decrease in the actual weight of the liver (S.S. 1:1,000) was observed. It should be noted, however, that in all experiments with esters of oestradiol the relative weight was greater than that of control gonadectomized animals (S.S. 1:100–1,000), returning to or even exceeding the normal relative weight (Tables I and II). This fact suggests that oestrogens may in reality have a stimulating effect on the liver, which is produced in spite of, and is obscured by, the general depression of growth of the organism.

This stimulating effect on the liver was clearly demonstrated by the increase in both actual and relative weights of the organ (S.S. 1:100–1,000) and in size of the cells after administration of small doses of oestradiol esters with a rest interval of 10 to 52 days between the last injection and the date of killing (Table II, Group 13). This indicates that some of the toxic effects of oestrogens might be prevented by administering small doses of oestradiol esters with a mild action but prolonged activity.

This suggestion as to the stimulating effect of oestrogens appears to be contradicted by the results of the measurements of the liver cells, which in Groups 7 (Table I) and 7–12 (Table II) were slightly smaller in rats injected with oestrogens. When, however, sections of these livers were stained with scharlach red there was found to a great decrease in or disappearance of the lipoid droplets in the cells; this gives a very probable explanation of the discrepancy and of the cause of it, since disappearance of fat from the cells should result in a decrease in their size. In agreement with this is the fact that the livers of oestrogen-treated animals are always dark brown in colour, while those of normal and especially of gonadectomized control animals are much lighter. This appears to be due to the disappearance of fat from the cells in the former animals.

The effects of oestrogens on the weight of the *heart* in rats of both sexes are similar to those on the weight of the liver: while, as compared with gonadectomized controls, no constant or significant effect on the actual weight of the organ was noted, the relative weight was in most cases increased (S.S. 1:100–1,000). Measurement of the muscle fibres showed no significant change, nor were any other histological changes noted.

However, the presence of an increased amount of heart tissue per unit of body weight in oestrogen-treated animals might suggest, as in the case of the liver, a stimulating effect of oestrogens on the heart. In any case, in ovariectomized animals the relative weight of the heart, which in the gonadectomized uninjected controls was decreased, was restored by oestrogens to or above the normal level.

Effect of Male Hormones

In general the effects of the various compounds of male hormones on gonadectomized animals are similar, varying only in degree. They are shown more clearly in the experiments of longer duration, on which the conclusions are mainly based. For this reason, and for economy of space, the effects of the different male hormones are given separately in some of the longer experiments only (Series III).

Transdehydroandrosterone produces the weakest effect, testosterone propionate the strongest; androsterone, especially in females, possesses all the beneficial stimulating properties without producing in some organs (e.g., the uterus) pathological effects which appear after injections of testosterone propionate. Compared with gonadectomized control animals, (1) there was a decrease in body weight (S.S. 1:20–100) and fat deposition (S.S. 1:100) only with large doses of strong male hormones (testosterone propionate); (2) in both sexes androsterone and testosterone propionate produced hypertrophy both in actual and in relative weights of liver and heart. The hypertrophy was especially pronounced in the experiments of longer duration (S.S. 1:100–1,000 for liver, 1:100 for heart), but in most cases was significant even after a short period of injections in males (S.S. 1:100–1,000).

In comparing weights of heart and liver of gonadectomized injected rats with those of the intact uninjected controls (Group 1) an important difference between males and females appears: in males the weights of these organs were returned only to or towards normal (Table I); in females (Table II, Series III) they exceeded the normal level after injections of androsterone (S.S. 1:20–100) and testosterone propionate (S.S. 1:100). Thus, in gonadectomized females, as has already been described in the case of the weight of adrenals (Hall, 1940), the male hormones have also a *masculinizing effect* on the weights of liver and heart, which approach those of the males.

Histologically, in experiments of long duration androsterone and testosterone propionate, unlike oestrogens, produced slight hypertrophy of the liver cells in both sexes, when compared with gonadectomized uninjected controls, and of heart-muscle fibres in males. In females there appeared also to be a slight increase in the thickness of the muscle fibres with these hormones (Table II, Groups 16 and 19), but the difference in the figures was very small (paper replicas weighing 21 mg. in ovariectomized controls, against 23 to 24 mg. in the injected animals). Our rats were killed by bleeding and therefore the intermuscular spaces in the heart only very approximately can be considered to be occupied by blood vessels. When these spaces were compared as weighed paper replicas, the amount of vascular tissue was found in the case of males (Series III) to be as follows: castrated controls – 67 mg., and testosterone propionate – 75 mg. In females this difference did not appear. It appears, therefore, that the enlargement of the heart of males injected with male hormones can be explained by hypertrophy of muscular tissue, with probable hyperaemia and hypertrophy of vascular tissue. No other histological changes were found.

Effect of Male Hormones Injected Simultaneously with Oestrogens

When male hormones and oestrogens are injected simultaneously the effect of the latter dominates that of the former if large doses of oestrogens are used. Groups 14 in Table I and 24 in Table II provide good examples of this. Therefore all our statements made for oestrogens are valid also for the characterization of this action.

On the other hand, when the dose of oestrogens is comparatively small (up to 0.018 mg. per week in males—Table I, Group 13; and up to 0.09 mg. in females—Table II, Groups 22 and 23; compared respectively with Group 7 in Table I and Group 11 in Table II) the male hormones androsterone and esters of testosterone are able in most cases to neutralize some of the depressing effects of oestrogens on body growth (S.S. 1:100–1,000), liver (S.S. 1:20–1,000), and heart (S.S. 1:100).

It is necessary to emphasize one very important point—namely, that not only do the actual weights of the liver and heart in most cases exceed those of the control animals, but also the weights per unit of body weight. In females the relative weights of the heart exceed even those of the normal control animals (Groups 22 and 23 as compared with Group 3, S.S. 1:100–1,000). Therefore the addition of a small amount of oestrogens to the male hormones might in some cases (oestrogenic deficiency) increase the stimulating non-sexual properties of the male hormones, especially in females. From this point of view the natural occurrence of oestrogens in the organism, even of males, acquires a new significance in addition to their useful co-operative effect on the sex organs (see the literature and our own experiments on these organs in our previous papers, referred to below).

Effect of Male Hormones on the Isolated Heart of Castrated Rats (R. C. Burbank) *

Several experiments were performed on the isolated heart of normal and castrated rats, and of castrated rats

* We are most grateful to Prof. C. Lovatt Evans for his criticism and advice to use statistical analysis for the results obtained.

injected with androsterone and testosterone propionate, in most cases for a prolonged period of two months. A detailed account of these experiments and of the technique employed will be published elsewhere. A preliminary statement is given here of the results obtained in 85 experiments on 46 male rats when the potential strength of the heart was measured in these three groups of rats. The measurements were made by attaching 10 and 15 gramme weights to the level pulled by the heart's contractions and tracing these contractions on a kymograph. The amplitude of the contractions was measured on the tracings and their number counted before and during the suspension of the weights, in both cases for a period of one minute. Woodworth's (1903, p. 228) quotient of the potential energy of the heart was used for expressing the results obtained, which have been statistically analysed by one of us (J. Cohen), using the same method as above.

These quotients of potential energy of the heart in the three groups of rats were as follows:

	Before Test	During Test
Control normal rats	81.3	73.5
Control castrated rats	71.9	60.0
Castrated rats injected with male hormones ..	78.2	81.7

A statistical analysis of the results obtained showed that during the "weight test" the hearts of the uninjected castrated control rats were weaker than either those of the uninjected normal controls (S.S. 1:50) or those of the castrated rats injected with male hormones (S.S. 1:100).

Thus the results on the isolated heart are in complete agreement with those obtained by weighing of the organs and their histological examination.

Summary and Conclusions

Experiments made with sex hormones on 281 male and 503 female rats are recorded, with the resulting effect on the weights and histological structure of liver and heart, and also on the isolated heart of 46 male rats.

Hepatotrophic and cardiotrophic properties are non-sexual effects of male hormones, especially of androsterone and testosterone propionate.

Taking into consideration also their nephrotrophic property, described in a previous paper, the male hormones in suitable doses might be considered as very important natural physiological stimulants of such vital organs as the liver, heart, and kidneys.

So far as it is permissible, from the results obtained on animals, to suggest a therapeutical application of sex hormones to human patients, it seems that androsterone and esters of testosterone should be tried clinically in suitable diseases of the liver, heart, and kidneys when a physiological stimulation of these organs is required.

We again emphasize the suggestion given in the paper on the clinical application of the sex hormones in kidney diseases that androsterone is preferable to the testosterone esters as a physiological stimulant of liver, heart, and kidneys in both sexes, since it produces only a weak effect on the male and female sex organs and is present naturally in both sexes. It is most inadvisable to stimulate the sex function in patients suffering from such grave diseases as those of the liver, heart, and kidneys.

There is also a possibility that small doses of some oestradiol esters with a prolonged and mild action (such as oestradiol benzoate-butyrate), administered with long intervals between the injections, may also be considered to produce stimulation of the liver, and perhaps of some other organs. Because of the toxicity of oestrogens in overdose, however, great caution is needed in their clinical application.

From this point of view, in cases of deficiency of oestrogens in the organism, the simultaneous administration of male hormones with oestrogens might be advantageous, since the former are able to neutralize to some extent the depressing and toxic effects of oestrogens.

Grants from the Medical Research Council and the Lister Institute have enabled us to carry out this work, and to them our thanks are due. We wish to express our gratitude to Messrs. Ciba Ltd., in particular to Dr. K. Miescher, for the supply of the hormones.

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CHEMOTHERAPY AND CONSERVATISM IN ACUTE SUPPURATIVE OTITIS MEDIA

BY

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In the past have appeared many substantiated reports of striking results from sulphanilamide therapy, both in simple otitis and in suppurative otitis following paracentesis. An attempt is here made to assess its value in cases in which surgical intervention seemed to be urgent, but in which, nevertheless, it was purposely avoided.

Case I

A boy aged 9 returned to school with the remains of what had been called a common cold. There had been, however, an outbreak of "sore throat" in his family at the same time. He felt quite fit, and had a normal pulse and temperature, the only positive finding on physical examination being a subacute pharyngitis, the pharynx having the appearance of that seen the day following exfoliation in a moderately severe attack of scarlet fever. Eight days later he had had earache in the night, and the right drum was acutely inflamed in the upper half, while the postero-inferior quadrant was bulging with a bluish-grey sero-sanguineous sac extending into and resting on the adjacent canal. The left drum was normal. The temperature was 99° F., the pulse 90. Treatment with sulphanilamide was started. The sac quickly shrivelled up, leaving minute "puffs of cotton-wool" or "small snow-flakes" over the bulged area; the inflammation rapidly subsided, and in four days the drum was normal. On the following day the left ear started to behave in a manner similar to the right, responding to the same treatment in the same time. Deafness was only slight, and was very temporary.

Case II

The patient, a boy aged 8, following a cold two days previously, complained of bilateral earache which lasted the

whole night. In the morning his pulse was 114 and his temperature 101° F., while his pharynx was mildly inflamed. In both ears Shrapnell's membrane was inflamed and brightly injected; the normal contour and landmarks were obscured, but there was bulging of both tympanic membranes, in the postero-inferior quadrants—the right bluish grey, the left pinkish red. There was no mastoid tenderness. Local treatment was not considered necessary. Sulphanilamide treatment was begun immediately. Next morning the temperature had dropped to 98.8° F. and the pulse to 90, and his earache had gone. The sac in the left ear had shrunk a little; that on the right was slightly larger, until in the evening the whole canal was obliterated. On the third day the sac had become very much smaller, having a shrunken crenated appearance rather like that of a piece of dirty crumpled blotting-paper. It was now a quarter its original size; the normal contour of the drum was returning, and the outline of the malleus was visible, with the tip of the handle as a white knob. On the fourth day the right drum had reached the crenated stage, and was then a dirty cream instead of the previous bluish grey. On the sixth day both drums were approaching normality, but there was still some definite loss of lustre, with some brown staining of those areas which had previously been brightly injected, while over all were a few radial wavy dilated vessels. Hearing (as tested by a 30-in. watch), which had been impaired on the second day to the extent of Right −½ in. and Left −2½ in., was now normal. The normal pearly lustre and the tone of the drums were not recaptured till the eleventh day.

Case III

This patient, a girl aged 5, complained of earache within a few hours of the onset of a head cold. In the morning the temperature was 101° F., in the evening 104° F. The left drum showed a reddish-cream bulge in the postero-inferior quadrant, with a small bluish-grey bulla between the processus brevis and the sac. The fan-shaped area of acute inflammation and redness of the upper half of the drum was present as usual. Sulphanilamide treatment was instituted. On the following day the bulging was less marked, but the right drum showed streaking of the handle, with general flushing of the whole membrane. The temperature had dropped to 102.6° F. On the third day the left had quieted considerably, while the right showed a well-defined fan-shaped area or an arc, 4–7 o'clock, dirty white in the morning, changing to a deeper grey-white in the evening. The temperature was now 100° F., the pulse 96. On the fourth day the white arc had enlarged irregularly; it had become yellow and bulging, and definitely overhung the canal, with a few dilated vessels over the bulge. The fifth day saw a slight increase of the bulge, but the temperature was still dropping. On the sixth day the bulging was very much less, while the colour was a faint yellow with some streaks remaining. On the ninth day the left drum was normal in appearance except for some lack of lustre over the area originally affected. The right was pinkish. On the fifteenth day both drums were normal. Deafness was not appreciable at any stage, either to the whispered word or to a watch test, but with a child of this age it is notoriously difficult to place reliance on the latter test.

Case IV

A boy aged 9 had had acute otitis following measles one year previously. He was seen one evening half an hour after the onset of acute earache. The temperature was 99° F., pulse 96; both Shrapnell's membranes were inflamed—the right with three blackish bullae in the antero-inferior quadrant, the left with streaking of the handle. Sulphanilamide treatment was started. On the next morning the right canal was completely occluded by a bag almost inky black in colour. The temperature was then 98° F., and the earache was less. At 5 p.m. there was a discharge of blackish thin sero-sanguineous fluid from the meatus, while the earache was gone. Gentle cleansing revealed a perforation in the postero-inferior quadrant, an acutely inflamed Shrapnell's membrane, and a sodden appearance of the rest of the drum and of the canal, on which lay a considerable amount of bleached desquamated epithelium. The temperature had risen to 100° F. For the following two days there was a clear watery discharge, very slight in amount, with an occasional throbbing or full feeling in the ear on movement. On the seventh day there was some redness of the posterior of the drum; on the ninth the normal landmarks had reappeared and the postero-inferior quadrant was like dirty crumpled blotting-paper with pinkish streaks in the folds. On the twelfth day the drum and the hearing, which had been diminished, were normal.

Case V

A girl aged 5, admitted to hospital on September 27 with a moderately severe attack of scarlet fever, developed earache on the evening of October 15 with a temperature of 100.6° F., and was put on sulphanilamide. Her progress up till then had been normal. Her left drum was bulging with yellowish-white pus. Next morning the earache had gone. By the 18th the bulging had disappeared; the drum was becoming normal, and was patterned with the usual wavy dilated vessels. On the 21st lustre and tone were returning; the wavy vessels were then only very thin brown streaks. On the 25th both drum and hearing were normal.

Case VI

A girl aged 12 was admitted to hospital with scarlet fever on October 16. Her throat was very red, oedematous, and angry, and she complained of severe earache. She was given sulphanilamide. Her temperature ran between 99.6° and 98° F. for two days, and then fell to 97–98° F., while her pulse dropped from 100 to 76. The earache persisted in modified degree for two days. On examination a blackish-grey sac lay on the canal up against a redly inflamed membrane whose landmarks were obscured. By the 18th the sac had shrivelled and become lobulated, while two small blebs had appeared at the lower end of the handle. By the 21st the sac had completely gone and the blebs had been replaced by two red spots. There still remained some deafness and occasional discomfort in the affected ear. Hearing was normal on the 26th and the drum normal on the 28th.

Case VII

A girl aged 7 was admitted to hospital with scarlet fever on November 3. She had a very red raspberry-tongue, was powdering on the face and body, and had patchy exfoliation on the chest. She appeared to be seriously ill, and was very deaf. Her temperature remained 101° F. for two days, then gradually fell until it was 97.6° F. on the fifth day, while the pulse dropped from 132 to 96. Treatment with sulphanilamide was started on admission. The left drum showed slight otitis media, while the right was bulging with pus, and a bead of this yellow-green pus, obviously thick and tenacious, had just burst through a small perforation in the postero-inferior quadrant. On the 4th the earache had gone, while the bead of pus had dried or had become inspissated, assuming a conical shape. On the 7th the bulging was gone. The area was now a deep brownish colour, while the conical bead appeared to have become softer and to have sagged somewhat, probably owing to leakage of a minute quantity of serum. On the 11th deafness as tested by a 30-in. watch had risen from *nil* at contact to 12 in., the antero-inferior quadrant was normal except for some fine streaking. Shrapnell's membrane was still moderately inflamed, but the processus brevis had regained its normal white appearance. Progress thereafter was rather slow; hearing was normal by the 19th and the drum normal on the 21st—that is, eighteen days from the onset.

Discussion

From the case histories all seven appear to be cases of acute suppurative otitis media due to haemolytic streptococcal infection, especially Case I. It may be questioned whether all were in fact "suppurative" otitis, or whether some of them may not have been "catarrhal" in type. Clinically, it is usual to divide otitis into the catarrhal and suppurative forms, but the distinction is largely one of degree. Mollison (1936) says that "fever, earache at night, deafness, and a variable degree of bulging and injection of the drum with obscuration of the usual landmarks are signs each strongly suggestive of suppurative otitis, present or impending, whereas in simple catarrhal

otitis the symptoms and signs are usually ill defined." Past experience with similar ear lesions treated by paracentesis convinces me that the present cases were very definitely suppurative in type. The sudden onset, the earache at night with bulging in a few short hours, deafness and pyrexia in all of them, actual rupture of the drum in two cases, and in three the development of "snowflakes" or "puffs of cotton-wool" due in all probability to localized massing of pus cells, scattered over the inside of the drum, strengthen this conviction.

It has been generally agreed that with a bulging drum, be it due either to acute catarrhal or to acute suppurative inflammation, abortive measures are neither adequate nor safe. Watson-Williams (1933), Graham-Brown (1936), and Colledge (1937), in the more recent literature, suggest that "immediate" incision of the drum is necessary. If sulphanilamide therapy is capable of favourably influencing otitis (acute infection of the middle ear) at both the earlier and the later stages (Horan and French, 1938) the same good results should be possible in the intermediate stage—that is, in cases of suppurative otitis with bulging in which rupture has not taken place. It was decided, therefore, with some trepidation, and not without some anxious moments later, to try the effect of sulphanilamide without resort to surgical measures. All cases were treated as of the same age group for purposes of dosage. 7½ grains of sulphanilamide (1 tablet) was given, crushed or to be chewed, every four hours for the first two days, the number of tablets being reduced on alternate days by one till the patient was receiving two tablets only on each of the last two days. That was the minimum dosage, but where the local ear signs were not clearing satisfactorily reduction of the number of tablets was delayed. The average total per case was 225 grains over an average of seven days.

To be able day by day to observe clearly the progress made, through a canal unblocked by the usual discharge of pus, to note the gradual diminution of the bulge, to see the normal landmarks return and the inflammation disappear as resolution became complete and normal lustre and function were restored within a few days, was a novel experience. No less pleasing was the appreciation of the fact that by avoiding surgical measures these children were escaping not only the mental and physical trauma inseparable from anaesthesia and surgical operation but the further danger of superadded infection. Even in Case IV, in which rupture of a sero-sanguineous sac took place within a few hours of the onset, probably from greater virulence of infection, the discharge quickly became clear and very small in amount, so that after the first few hours there was no interference with visualization of the drum. Case VII was probably the most spectacular in that the infection was completely arrested at the actual stage of rupture. The likelihood of spontaneous remission may be dismissed as all the cases had a sudden onset, and even in a case of simple catarrhal otitis Mollison (1936) believes that with a sudden onset there is little chance of resolution. How much truer must it be with a drum bulging with pus! With such a small number of cases controls were out of the question, but I may be permitted to compare, or rather to contrast, other children treated in the same way during the same epidemic, seen at a later stage when rupture of the drum had taken place and a discharge had existed for at least twenty-four hours. In those the discharge remained purulent, the average time taken for complete recovery being twenty-three days, whereas in the present series the average was eleven days. Even with so small a number the results were so outstanding as to suggest that, if seen early and sulphanilamide therapy is immediately instituted, conservatism may be practised with safety in cases of bulging in which rupture has not taken place, with a dropping temperature, disappearance of pain, diminution of deafness, lessening of the bulging, and a reasonably steady pulse.

Summary

Seven cases of acute suppurative otitis media with bulging of the drum, occurring in children and successfully treated without paracentesis, are described.

The treatment adopted was the early use of sulphanilamide in adequate dosage. No local treatment was considered necessary.

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CYSTICERCOSIS EPILEPSY

BY

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The following case is of interest on account of the relative rarity of the condition and the unusual clinical features presented.

Case Report

A soldier aged 37 was admitted to the neuro-psychiatric wards of an emergency hospital on November 8, 1940, for observation on account of marked abnormalities of conduct. There was a history of his having wandered away from his post while on guard duty and being unable to give any satisfactory explanation of his conduct. The patient was of good physique and was the eldest of seven children, all of whom are alive and healthy. Childhood was normal and he had had no illnesses. He served his apprenticeship as an iron-moulder, and in 1923 joined the Army. In January, 1927, he was drafted abroad, and served in various districts of Northern India until December, 1933, when he was placed on the Army Reserve and returned to London. While in India he contracted sand-fly fever in 1929 and suffered from intestinal colic of unknown origin in 1931.

He remained healthy and in constant employment until October, 1934, when he awakened one morning with "cramp-like" pains in both arms and both legs, and was informed by his room-mate that he had been throwing his arms and legs about during the night. He attributed his symptoms to the effects of nightmare, and did not seek medical advice. In May, 1935, he was found lying on his bedroom floor one morning, and had no memory of what had happened. He sought medical advice, but does not seem to have received any treatment. In November, 1936, he had an attack of "mental confusion," which came on suddenly, but there is no history of loss of consciousness or of falling. He was treated at this time with 1 grain of luminal at night, but the diagnosis of epilepsy does not seem to have been established. He remained well, and was called up for service in September, 1939. In May, 1940, when in France, he felt a choking sensation while bending over his haversack, and then lost consciousness. On recovering, his arm muscles were painful, but his companions informed him that there had been no evidence of twitching and that his colour had remained pale. He returned from France in June and remained well until September, 1940; at this time, while on guard duty, he felt a choking sensation coming on, and left his post in order to sit down. He did not remember anything further until he wakened up in the guardroom and was informed that he had threatened an officer with violence. In view of his plea of loss of memory he was transferred to this hospital for observation and investigation.

On admission no abnormality was noted in his physical condition. Examination of the central nervous system was negative. His blood gave a negative reaction to Wassermann

and Kahn tests. The cerebrospinal fluid gave a negative Wassermann reaction, the Lange test was 0111000000, Fehling's test was negative, no increase in globulin was found, and there was one small lymphocyte per c.mm. In view of his history the possibility of epilepsy was considered, and it was decided to utilize pitressin after his water balance had been established as a diagnostic test. This was carried out on November 13, but beyond the onset of severe frontal headache and nausea no definite result was obtained. At this stage the possibility of cysticercosis infection was considered, and it was elicited that pork had been a fairly regular article of his diet while in India. On November 14 radiographic films of the skull, root of the neck, upper arms, forearms, thighs, and legs were taken as a routine measure. The standard of radiograph aimed at was that of ordinary exposure conditions for bone detail with a very slight under-exposure. Widespread evidence of cysticercosis infection was obtained. The degree of opacity in the various cysts was seen to be uniform, and indicated that the infection was probably of equal duration in all parts.

Discussion

As MacArthur has pointed out in his original article on the subject, the history itself—namely, in the absence of any evidence of a familial or personal epileptic taint, the onset of fits in an adult who is not suffering from neoplasm, syphilis, or the after-effects of head injury—may be suggestive. The history of residence in India increases the possibility of cysticercosis infection, although the absence of such a history does not necessarily rule out this possibility. In most cases the diagnosis is easily established if palpable cysts are present, since one of these may be excised under local anaesthesia and examined in detail. In the present case this was not possible, as the parasites had lodged deep in the muscles and so escaped detection by any other means than that of radiography. In the absence of palpable cysts no single series of examinations can be relied upon to exclude cysticercosis, and in doubtful cases it is advisable to keep suspected cases under observation, examining the body surfaces at regular intervals for the development of superficial cysts and performing regular radiographic examinations. Blood films are considered to be of little diagnostic value, since, although an eosinophilia may be present in the earlier stages when the embryos are active in the body, in the established condition the parasites have become walled off and exert little influence on the blood picture. The prognosis in this condition must be a matter of extreme difficulty, since during life there is no method of determining the number of cysticerci present in the body or of ascertaining their future behaviour, on which the prognosis depends.

Summary

A case of cysticercosis epilepsy presenting unusual clinical features is described.

Emphasis is laid on the importance of regarding every case of epilepsy occurring in a previously healthy adult who has lived for a period in the Tropics as a probable case of cysticercosis until it has been proved otherwise.

The value of radiographic investigation in this condition is demonstrated.

A negative radiograph of the skull is not considered to be of any significance, since well-marked calcification can be demonstrated in cysts of the soft tissues.

Calcification of the cysts is a relatively slow process, and the degenerative changes may be complete in the muscles at a time when the brain is unaffected.

The size of the cysts depends mainly on their age and situation. If in firm tissues, where they are subjected to equal pressure on all sides, they are small and rounded; while in the muscles, where the pressure is unequally distributed, they lie between the muscle fibres and are oval in shape.

Evidence is produced in support of the theory that the cysticerci while alive enjoy a relative tolerance on the part of the host, but that after death they act as foreign irritants and produce changes partly by their toxic effects and partly by increased pressure on the surrounding tissues.

My thanks are due to Lieut.-Colonel G. Petit and to Dr. A. M. Dryden for facilities in examining this case, and to Dr. J. Kemp Harper and Dr. J. Fergus Henderson for carrying out the radiological investigations.

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CASE OF VENTRICULAR FISTULA

BY

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The recording of a solitary case can scarcely be expected to add much to our knowledge of the local effects of the newer chemotherapeutic agents, yet the following case presents some unusual features, justifying a very brief summary that includes only the essentials.

Case Report

A man was admitted to an E.M.S. hospital on June 1, 1940, having sustained a gunshot wound of the head an indefinite number of days previously. On account of cerebral compression he was unable to give any history, but it is known that he was not picked up until three days after receiving the wound. On admission there was a jagged septic wound of entry in the left parietal region, with foul discharge. The patient was semi-comatose and lay coiled up on his side. He had photophobia, right homonymous hemianopia, and weakness of the right leg, with up-going toe. A penetrating wound of the forearm, with compound fracture of radius and median nerve injury, was also found. The temperature was 99°, the pulse 56, and the respirations 18. Radiographs showed foreign bodies in the brain and a comminuted fracture of the left parietal. He was treated with 1 gramme of sulphapyridine (M & B 693) four-hourly, magnesium sulphate enemas, and intravenous sucrose injections.

On June 4 the scalp wound was excised and the opening in the skull enlarged, care being taken not to disturb any dural adhesions. The brain was black and mushy and foul-smelling. The track was explored for two inches, and portions of bone, metal, and hair were removed, together with much pus and broken-down brain. The longitudinal sinus was found plugged with septic clot; this was removed and the sinus packed with flavine gauze. A flavine pack was applied over the whole wound. Culture from the wound gave a profuse growth of organisms of the *B. coli* type. Post-operatively a fungating hernia cerebri developed; the track was explored with sinus forceps on several occasions, but only a small quantity of pus was obtained.

June 10.—Definite improvement. He was fully conscious, the pulse was 72, the fields of vision had improved, and the hernia was not increasing.

June 28.—For the past few days he had been getting worse again; the hernia cerebri was increasing and cerebrospinal fluid was escaping in large quantities from the centre of the hernia: evidently there was a fistula through to the lateral ventricle. Further treatment with sulphapyridine and hypertonics was given.

July 5.—The temperature was now 103°, and there was stiffness of the neck and pain in the back; large quantities of cerebrospinal fluid were still escaping, becoming slightly purulent. By lumbar puncture a heavy purulent fluid was obtained, practically pure pus, with very high cellular content, 95% polymorphs; cultures showed coliform organisms corresponding to those previously found in the brain; chlorides 0.665%,

protein 0.520%, no sugar. It is to be noted that the fluid was not under pressure, probably owing to the rapidly leaking fistula. Sulphapyridine was continued by injection, but no improvement was seen.

July 16.—Operation: the scalp was freed from edges of wound and freshened. Too much of the dura was missing to permit of closure; the edges of the sinus were cleaned up and the whole wound and fistula were packed with sulphapyridine powder; the skin edges were carefully approximated and closed watertight. Lumbar punctures and hypertonic treatment were continued.

July 24.—Considerable improvement; the wound healed by first intention. The cerebrospinal fluid was still cloudy—cells 910 per c.mm., polymorphs 95%, many pus cells present, cultures sterile; chlorides 0.710%, protein 0.185%, trace of sugar.

From this point progress was uninterrupted, and six months later the only remaining neurological signs were a right lower quadrantic hemianopia and a pulsating closed hernia cerebri of comparatively small dimensions. In the interval the divided median nerve had been sutured in the forearm, and now showed early signs of recovery.

Commentary

The special points to be noted in this case are: (1) The care taken to avoid meningeal infection in the first operation. (2) Despite intensive hypertonic treatment, the open hernia cerebri dragged upon the lateral ventricle and so led, after a time, to the formation of a fistula. (3) The fistula inevitably led to infection of the ventricles and then to spread to the basal and spinal meninges; it also produced profound alterations in the hydrodynamics of the cerebrospinal fluid, which accounts for the unusual features, such as the replacement of the fluid by frank pus under no increase of tension. (4) The failure of general chemotherapeutic treatment to arrest the widespread meningitis under these special circumstances; nevertheless the wound healed per primam although bathed in purulent cerebrospinal fluid. (5) After closure of the fistula the fluid had to pass through the foramina in the roof of the fourth ventricle and so dilute the spinal fluid, probably carrying to it sulphapyridine obtained from the wound and possibly some also from the blood stream.

Clinical Memoranda

Abscess of the Medulla Oblongata Associated with Chronic Pulmonary Tuberculosis

The unusual clinical features of the following case make it interesting enough to be placed on record.

CASE REPORT

On the evening of December 11, 1940, a police constable aged 43 was admitted to St. Thomas's Hospital, having been ill at his home for ten days. His health had previously been good, apart from a single attack of haematuria, for which he had been treated in 1933; and he had been on duty until the onset of his illness.

His original complaint had been of severe headache and aching in the back and limbs; he had also noticed some unsteadiness of gait. After three days vomiting started, and became increasingly troublesome. Four days before admission obstinate hiccup developed; he then noticed numbness of the right side of his face and of his right arm for the first time. He described the headaches as being confined to the frontal region. The onset of vomiting he associated with eating fish which he thought was not fresh. After vomiting had persisted for three days he found that it was getting increasingly difficult to swallow, and this difficulty was particularly noticeable when taking fluids. His appetite was good and he felt that he wanted to eat. He had had a chronic cough for some years, but during the last four days he had remarked that the cough had suddenly stopped. His bowels had been constipated since his illness and he had passed only small quantities of concentrated urine.

On examination he was markedly cyanosed and wasted; his temperature was 101.6°, pulse 52, and respirations 28. There was a fine nystagmus on looking both to the right and to the left. The disks were difficult to see, but appeared blurred at the edges. The tongue on protrusion deviated to the left. The speech was slurring. There was diminished sensation to pin-prick on the right side of the face and on the right arm. No other abnormality was found in the central nervous system. Examination of the chest showed poor air entry on both sides, more especially at the lung bases. He regurgitated fluids when given drink. When at rest he did not appear unduly distressed, but he became very dyspnoeic on slight exertion. His blood urea was 26 mg. per 100 c.cm., and the blood Wassermann reaction was negative. The cerebrospinal fluid showed: 12 cells per c.mm.; total protein 0.055%; a faint trace of globulin; and a negative Wassermann reaction. The fluid was not obviously under pressure.

A radiograph of the chest showed evidence of apical tuberculosis, more pronounced on the right side than on the left. The right base was emphysematous and the lower two-thirds of the left lung showed evidence of early bronchopneumonia. The patient was very dehydrated, and 5% glucose in saline was given by means of a slow intravenous drip; but he became distressed, so rectal glucose salines were substituted. His condition deteriorated rapidly, and the following day his speech was unintelligible. He showed signs of increasing pulmonary oedema and died during the afternoon.

A post-mortem examination was performed by Dr. J. A. R. Miles, who reported as follows:

> "Lungs.—A small spontaneous pneumothorax on the right side. Both lungs show apical tuberculosis, the right showing a number of small cavities. There was gross oedema of the bases of both lungs.
>
> Brain.—A small abscess about 0.5 cm. in diameter, situated centrally in the upper part of the medulla oblongata. There were no other significant abnormalities."

Death was due to the development of a septic abscess of the medulla oblongata following upon a chronic tuberculous infection of the lungs, which had become secondarily infected.

A film of the pus showed large numbers of Gram-positive cocci; tubercle bacilli were not found. Culture from the abscess was not done, as it was thought that it would give no further information of value, the infection being an impure one.

I am indebted to Sir Maurice Cassidy for his permission to give an account of this case.

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Perforated Oiled Silk in the Treatment of Burns

I am prompted to write this short note after reading the leading article in the *Journal* of November 16, 1940 (p. 672), and the report of the Royal Society of Medicine in the same issue (p. 679) on the treatment of war burns.

The present-day treatment of burns by tannic acid and gentian-violet, although giving excellent results as a rule, is not always satisfactory, particularly when sepsis occurs. The treatment of these septic areas is a problem, and in spite of all the various types of applications of lotions, oils, and even skin grafting, they often refuse to heal. The failure of epithelization is in my opinion due to too frequent dressings, which not only prevent healing and subject the patient to a daily torture, but even when carried out under an anaesthetic reduce him or her to a nervous wreck.

METHOD OF USE

Any treatment which produces this state of affairs is obviously wrong, and through the kindness of my colleagues

at the Liverpool Royal Infirmary I have had the opportunity of trying out the value of a partially occlusive dressing in the form of perforated oiled silk. It is applied as follows:

1. A simple zinc paste or ointment—e.g., ol. morrhuae et ung. zinci (*B.P.*) āā—is spread for a breadth of about half an inch on the surrounding sound skin reaching up to the edge of the burnt area.

2. A sheet of oiled silk, perforated with holes one-eighth of an inch in diameter and half an inch apart, is then cut to the size and shape of the burnt area, but with an overlap of half an inch to lie on the ointment margin. It is sterilized, preferably by boiling, and is spread out and placed direct on to the raw surface.

3. Dry gauze or a saline compress is put on the top of the oiled silk and the part is lightly bandaged.

4. This dressing should be left quite undisturbed, and changed entirely twice a week only, when the margins of the burn are cleaned and the oiled silk is resterilized and replaced.

5. The gauze may be changed daily, but it is important that the raw area should be left untouched during the redressing.

6. As the part heals in from the edges the oiled silk should be trimmed to fit.

RESULTS

The improvement in the appearance of the wound (although, of course, this will vary according to its age) and in the general well-being of the patient is most pronounced in a few days. Gone are the terrors and horrors of the daily dressing, and, instead, cheerfulness and sound sleep return.

The rationale of the treatment is the protection given to the growing epithelium and the opportunity provided for it to proliferate, as it should, in its own serous discharge, without interference and without antiseptics. In the presence of the efficient drainage provided, the bactericidal action of the secretion from the wound is adequate to cope with any superficial infection, and there is consequently no septic absorption. Islets of epithelium rapidly appear, and capillaries develop so quickly in the healthy granulation tissue that their delicate walls are ruptured by the slightest injury or even, as in one case, under the influence of gravity. This patient had to be kept lying prone, as she was burned on the back of the thighs, and change of posture caused free bleeding in a few hours.

The healed skin resulting from this treatment, while not entirely devoid of thickened scar tissue, compares very favourably with the results of other mthods. The total number of cases treated is not large, but the burns have been extensive—in one case the areas measured 11 by 5 inches on the back of each thigh.

This method has also been tried in the primary dressing of a number of cases of small burns, with results which compare very favourably with those of other methods, and my experience leads me to suggest that further use might be made of it. It is not a new treatment for burns, and it is possible that perforated cellophane or some other non-adhesive material might be substituted for the oiled silk.

Liverpool, 1. R. STOPFORD-TAYLOR, F.R.C.S.Ed.

The February issue of *Industrial Welfare and Personnel Management*, the journal of the Industrial Welfare Society (14, Hobart Place, S.W.1), contains an article on hours of work which enforces the point that by undermining health long hours of work lower both quality and quantity of output. Striking evidence of the futility of overtime is shown in figures from an engineering firm: In January–June, 1940, 26,200 more overtime hours worked than in previous year; but also 23,800 more hours of absence; net addition only 2,400 working hours. Three-shift systems are generally recognized as making the best use of men and machines, "as machines can be used quite continuously, while workers are on duty for only eight hours a day and forty to fifty hours a week." It is not always possible, however, to obtain the necessary labour, and various alternative arrangements of hours are described in some detail.

Reviews

FRACTURES

Fractures. By George Perkins, M.Ch., F.R.C.S., Assistant Orthopaedic Surgeon to St. Thomas's Hospital. (Pp. 384; illustrated. 20s. net.) London: Oxford University Press. 1940.

There are certain well-known medical synopses which have long been popular, though chiefly for examination purposes. This book on fractures is a cross between a synopsis and an ordinary textbook. There is no preface, no introduction or references, and one finds throughout a dogmatism and an apparent objectivity that would lead the innocent reader to suppose that in the treatment of fractures the last word has been spoken. Actually the teaching is Mr. Perkins's own, and is in fact no more impersonal than the collections of lectures which from time to time have been brought together and published by other distinguished teachers in medicine and surgery. It is therefore a little unfortunate that in dealing with a subject in which man-made methods of treatment vary so much, each in the hands of its advocates yielding fairly good results, so able a teacher as Mr. Perkins should adopt a pontifical style. It also makes it easier for critics to find holes in his work, particularly where he is dealing with topics that are not usually regarded as within the province of the orthopaedic surgeon. For example, fractures of the skull are described in a manner so sketchy as to be quite useless; nor is it quite so easy as he suggests to reduce fractures of the nasal bones. His description of the treatment of open fracture is inadequate; the last few months have taught us that in compound fractures shock cannot always be disregarded, and we have come to be much more precise in the technique of excision of an infected wound. Yet the only thing that Mr. Perkins has to say about the skin incision is that one should not enlarge the wound more than is necessary: poor counsel for a worried resident surgical officer who wants to know how big the incision should be—in other words, what *is* necessary.

But having drawn attention first to these blemishes we can more easily commend all that remains. There are about this book, particularly in the introductory chapters, a clarity and precision that compensate for the somewhat jerky style. If a small allowance is made for the fact that the author is an advocate of under-treatment rather than over-treatment, of less rather than more splinting, it is fair to say that the man who follows his instructions will not often go wrong. The value of active movements from the earliest possible moment, and the dependence of functional recovery on the patient's interest in and use of the damaged part, could not be more clearly stated. It is possible that some will be a little nervous about the light-hearted way in which fractures of the lower end of the fibula, stellate fractures of the patella, and fractures of the shaft of the humerus are left to recover by natural means. Yet if the standard of simplicity and absence of meddlesome intervention so characteristic of this book were to be seen in the fracture departments of our hospitals much suffering and disability would be avoided.

Something must be said about the arrangement of the pages. The illustrations are all diagrammatic, and though many of them are crude they are on the whole effective. But when the author has finished with one subject the letterpress stops even if it has covered only a quarter of a page. What is meant to fill these gaping voids: the

reader's notes? If they are not intended for any such purpose, then one can only conclude that there is more paper in the country than we thought.

PHYSICS OF THE ATOM

The World and the Atom. By C. Möller and Ebbe Rasmussen. Foreword by Prof. Niels Bohr. (Pp. 199. 10s. 6d. net.) London: George Allen and Unwin, Ltd.

There can be no doubt that to the scientist of the future the first half of this century will be marked down as the period in which the subject of atomic physics was born. Fifty years ago the suggestion that an atom had a complex structure would have been regarded with suspicion, while to-day we not only know an immense amount about that structure but we know many of its details with astonishing accuracy. We actually know the diameters and periods of the electron orbits with greater accuracy than we know the dimensions and orbits of the planets of our solar system, and from movement of these electrons we are able to unravel with absolute precision the vast complexity of the lines of the spectrum. Moreover, there is scarcely any scientific investigation of the present day which does not make use of atomic physics; it is the basis of wireless reception, it is fundamental in the development of *x* rays, and it is the whole secret of radium. Yet its comprehension involves physical concepts of the greatest difficulty, which can really only be fully explained by the most advanced and intricate mathematics.

The World and the Atom is an attempt, and a very successful attempt, to explain in non-mathematical language the essential physics of the atom as it has been revealed by the work of physicists of the last forty years. Beginning with a general statement of atomic structure, it enters at once upon a historical account of the work of Becquerel and Rutherford on radium, and shows how this gave the first insight into the structure of the atom, and it explains how this structure accounts for the production of spectra and of *x* rays. The next chapter deals in greater detail with the minute structure of the atom and describes how this has been investigated and how the whole of the elements have been classified and indexed. The remainder of the volume deals with the extremely difficult problem of the structure of the atomic nuclei and the revolutionary methods by which this has been investigated, and with some of the implications in cosmic physics that are involved.

The whole book forms the clearest possible account of atomic structure, and it deserves careful study by all those who are to make use of modern physical methods. Even those who are fortunate enough to possess a good mathematical equipment will find it well worth while to look at those subjects from a more popular aspect and to realize that the problems they have been accustomed to express in mathematical formulae can, at least in outline, be described in simple terms.

INTERRELATION OF ABDOMINAL DISEASES

Inter-relation of Abdominal Diseases. By Elemér Forrai, M.D.Budapest, L.R.C.P. With a foreword by Sir Arthur Hurst, D.M., F.R.C.P. (Pp. 168. 12s. 6d. net.) London: William Heinemann (Medical Books) Ltd. 1941.

The study of structure, whether normal or pathological, has always had to precede that of function. In the case of the alimentary tract this led in the past to an artificial separation in our conception of its various diseases. Of recent years that attitude has to some extent been modified by three factors: the recognition of the frequency with which dyspepsias are based on organic lesions on the right side of the abdomen; the importance attributed to visceromotor reflexes; and the study of allergy. The stage was therefore well set for the appearance of Dr. Elemér Forrai's book on the interrelation of abdominal diseases. Starting with cholecystitis, he points out that dysfunction of the gall-bladder or biliary stasis may be due to inhibitory reflexes from chronically diseased portions of the digestive tract. The bacteriology of cholecystitis indicates, though the ways of infection are different, involvement of several abdominal organs and the unity of origin of their inflammatory changes. He then goes on to discuss appendicitis, calling attention to the way in which it may excite spasmodic hour-glass contraction of the stomach, and to the importance of achlorhydria in permitting infection of the alimentary tract lower down. We can understand that removal of the appendix alone is of little value if it is only one part of the pathologically changed intestine. Dr. Forrai adopts Craven Moore's conception of reflex dyspepsia from a lesion more or less remote from the stomach itself. The gastric symptoms which occur in connexion with such lesions may be due partly to visceral reflexes, but in the end gastritis will develop. He prefers to speak, therefore, of gastro-appendiculo-cholecystitis, and in support of his thesis that it is a hereditary familial disease gives a number of interesting family trees. The connexion between the liver and this combined disease is worked out in an interesting manner, in which stress is laid on the detoxicating influence of the liver, and the author maintains that all allergic manifestations are accompanied by hepatic insufficiency which diminishes its detoxicating power. Due importance is given to emotional factors in upsetting visceromotor reflexes which allow of disturbed secretions and unchecked infections. An interesting point, in view of recent work on hepatic damage in the severe forms of thyrotoxicosis, is the effect claimed for a damaged thyroid as a contribution to the allergic state.

Though marred by some tiresome reiterations and the not infrequent misspelling of the names of the authorities quoted, this is a thought-compelling book well worthy of attention. Sir Arthur Hurst, to whose teaching the author is evidently much beholden, contributes an appropriate and commendatory foreword.

MIND AS A DISCRETE ORGAN

The Human Mind: The Organ of Thought in Function and Dysfunction. By Murdo Mackenzie, M.D., M.R.C.P. (Pp. 215. 7s. 6d. net.) London: J. and A. Churchill. 1940.

This small volume sets out a somewhat new approach to the problems of psychotherapy. Dr. Mackenzie looks on the mind of man as a discrete organ with a specific function, working in rhythm in space and time and driven by strictly mental forces. This notion, he suggests, is new and is elaborated for the first time in this book. To claim novelty for any opinion about the mind is somewhat bold. Something very like this approach has marked more than one ancient philosophy, but it has certainly not previously occurred to the psychology of the present age, with its unbalanced and incomplete "scientific" outlook. When the function of the mind is disturbed it is, according to Dr. Mackenzie's experience, accelerated in anxiety, retarded in apathy, or isolated from external contact in defence. In all these states, he says, it can be accurately observed. During and after readjustment the organ can be studied in the process of passing from faulty to full function, and the passage reveals that the same driving forces are present throughout. These are specific to the organ and their nature is strictly mental. Maladjustment of these forces is the common cause of nervousness and the resultant and widespread human suffering; readjustment restores hope, efficiency, and confidence. The future

of psychological medicine should, he considers, lie in the direct investigation and accurate description of the laws governing the mental organ.

Dr. Mackenzie has been a consistent champion of what Jung has called the "introvert"—the person who, from his relatively deliberate mental movement and narrow focus on life, has tended to be denied sufficient scope and the credit he deserves in a highly specialized and distracted world. The author is here chiefly concerned with the therapy of the depression which overtakes the "deliberate-simplifying" type of mind when it is thwarted by overmuch subjection to the current "immediate-amplificatory" methods of thought. There is nothing strikingly novel either in his clinical description of the problems of this kind of patient or in the lines of treatment he advocates, but his essay is likely to throw valuable fresh light for clinical psychologists upon syndromes which, when approached in certain ways that are now current, remain unintelligible and intractable. His stressing of the conflict of the opposites as a normal state of the healthy human mind is valuable; neglect of this fundamental fact is responsible for a good deal of the ineffectiveness of modern psychotherapy. He also includes some interesting deductions about the war and its psychological background. He has made a distinct individual contribution to practical psychology, and one which its practitioners would do well not to ignore.

Notes on Books

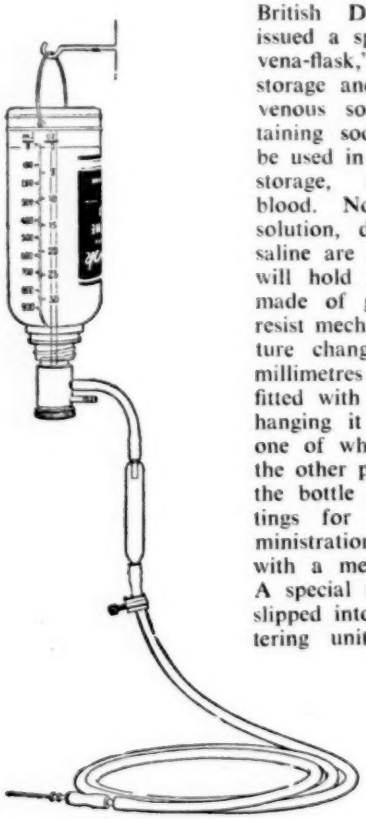
A little slip of a book, *The New M.O.*, was recently sent to the writer of this note for comments. It is a small pamphlet of twenty pages, written for medical officers attached to A.A. units by Colonel C. A. WEBSTER, T.D. The value of the little book varies inversely as its size; it is crammed full of sound, practical advice; it is worthy of study and application by all Army M.O.s. "The M.O. who is imbued with the idea he is to be 100% doctor will not be a *persona grata* with his C.O." "Your liaison with the regiment must be a happy contribution of social and business contact." Helpful detailed hints on the thousand and one duties of the M.O. are clearly and concisely given. Prevention of illness and preservation of health are ideals which it is possible to carry out in the Army, and which one day will also be practicable in civil life. Colonel Webster is to be congratulated on his effort. The book is printed for circulation in his Division only. It should be made available for all medical officers.

JULIUS SIGURJONSSON'S little book, *Studies on the Human Thyroid in Iceland*, is one which may be read with interest by all students of the thyroid gland. In it are presented the results of a study of the size, weight, iodine content, and structure of the gland in the general population of Iceland. His own data are compared with statistics from other regions and their significance is well discussed. It is shown that the weight of the thyroid is unusually low in Iceland, as it is also in Japan, Bergen, and Aberdeen. In an interesting chapter on hyperplasia the author produces evidence to support his view that the usual stimulus to thyroid hyperplasia is rather a low total iodine content of the gland than a low iodine concentration per gramme, as has been suggested by Marine. Neither in this chapter nor in a subsequent one on nodule formation is any mention made of hyperthyroidism in Iceland. It would have been interesting to see comparative figures of its frequency here and elsewhere. The book is priced at 6s. and is obtainable from H. K. Lewis and Co.

Those who had the pleasure of hearing Dr. RUSSELL L. HADEN lecture in England a few years ago will not be surprised that his *Principles of Hematology* shows the same free use of diagrammatic representation (second edition, Henry Kimpton, 21s.). The student who uses this book will learn a great deal about the manufacture and function of the blood cells and will be equipped with a useful discipline for facing clinical problems. He will learn very little about the natural history and morbid anatomy of diseases of the blood. The physiological approach to clinical medicine is indeed beset with great difficulties, if only because of the narrow limits of our knowledge. The student might well begin with Russell Haden's book, but he should proceed to Janet Vaughan's *Anaemias*, Claude Forkner's *Leukaemia*, and the Rose Research on Lymphadenoma if he really wishes to learn the principles of haematology.

Preparations and Appliances

THE VENA-FLASK



British Drug Houses has lately issued a special type of flask, "the vena-flask," fitted for both the storage and administration of intravenous solutions. The flask containing sodium citrate solution can be used in addition for the removal, storage, and administration of blood. Normal saline, 5% dextrose solution, dextrose saline, and gum saline are also available. The flask will hold one litre of fluid; it is made of glass specially treated to resist mechanical shock and temperature changes, and is graduated in millimetres and fluid ounces. It is fitted with a rustless metal ring for hanging it up and with two caps, one of which acts as a seal, while the other protects the whole neck of the bottle from contamination. Fittings for the collection and administration of fluid are provided with a metal screw-cap adjustment. A special metal gauze filter can be slipped into position on an administering unit when blood is being given. The principle of the apparatus is similar to that of the Medical Research Council transfusion outfit, though more elaborate in detail.

VARIOSTAB

Variostab (Boots Pure Drug Co. Ltd.) is a preparation of ethanolamine oleate for the treatment of varicose veins. Ethanolamine oleate was reported on by Meyer (*Amer. J. Surg.*, 1939, **40**, 628), who found that it was as effective as sodium morrhuate and was superior to the latter preparation in that it did not provoke occasional allergic responses. Rogers (*British Medical Journal*, 1939, **2**, 383) considered ethanolamine oleate to be the most satisfactory of the sclerosing agents.

ALLANTOIN

It is becoming increasingly difficult to obtain synthetic compounds that are in any way out of the usual, and hence we welcome the announcement by Genatosan Ltd. that they are undertaking the production of a variety of fine chemicals. Among these allantoin is of particular interest. Two independent and somewhat unusual lines of research—namely, the study of the reputed healing action of comfrey root and the maggot therapy of wounds—both led to the conclusion that allantoin was the active agent, and that it caused leucocytosis and acceleration of wound healing. The latter is an action that is difficult to measure accurately, but the evidence available suggests that allantoin has a beneficial effect on the healing of septic wounds and ulcers.

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LONDON
SATURDAY MARCH 15 1941

FIRST AID FOR FIRST AID

One of the virtues of war is that it compels us to review old ideas and customs in a new light, especially when they relate to activities that have an urgent bearing on the war situation. One example of this is the renewed interest in and research on air-borne and droplet infections. Another is first-aid treatment of the wounded and sick, which, with the bombardment of our cities, is now a problem of the first importance. As our correspondence columns have shown, medical men are beginning to question the adequacy of long-established training methods in first-aid technique. Perhaps the main burden of the criticism has been that in peacetime first-aid instruction and manuals were directed too exclusively to the examiner rather than to the examinee. That is to say, the passing of an examination was something that loomed large in the minds of both teacher and taught, and not enough stress was laid upon the limitation of what a first-aider could do and how he should do it. Excellent as the teaching was, and however enthusiastic and intelligent was the first-aider, the victim of an accident ran the risk of delay in receiving expert medical treatment because of the desire of the first-aider to carry out to the last letter the elaborate details of bandaging and splinting which had been drilled into him. By the time the victim arrived at a hospital or doctor's surgery it was too often found that there was much to undo before proper and urgent treatment could be applied.

In making these criticisms we would not be thought to underestimate the magnificent work that has been done by the British Red Cross and the St. John Ambulance. For their admirable and self-denying work no praise can be too high. But it was probably with such criticisms in mind that the Birmingham Joint Committee of the British Red Cross Society and the St. John Ambulance Brigade decided "to investigate and report upon the present methods of training first-aid workers," and for this purpose set up a special first-aid subcommittee, having among its personnel not only medical officers of the two organizations but several of Birmingham's leading surgeons, including university professors. The subcommittee came to the conclusion that the standard of training of first-aid party leaders is low and that there is no proper training system for lay instructors; that the rank and file of the first-aid services have been taught too much unnecessary and even harmful detail; and that the seriously injured man should be handled by the first-aid worker as little as possible and be transported to hospital within the minimum period of time. What is needed is that the first-aid worker should be taught a lot about a little, rather than a little about a lot, and that he should firmly grasp the fundamental principles of dealing with cases of shock, haemorrhage, and asphyxia, and worry himself less about the elaborate bandaging that so handsomely illustrates the first-aid manuals. The Birmingham Joint Committee, recognizing that the basis of intelligent and skilful treatment is sound training, and that inefficiency is often the result of bad teaching, has boldly recommended the institution of a civilian first-aid training school; but for the time being the scheme has unfortunately been turned down by headquarters in London. The idea is not to disappear, however, because the new Birmingham Accident Hospital, urged on no doubt by the committee's report, has decided to undertake the training of first-aid workers for industry, and, as will have been seen in our advertisement columns, one of the duties of the new clinical director will be to supervise first-aid training, a step so far without precedent in hospital policy.

It is proposed that the civilian first-aid training school—when it comes into being—shall be staffed by a whole-time commandant and four permanent instructors, and that lecturers and examiners should be chosen from a gradually widening panel of medical men and women. The committee has also had the wisdom to see that the instructor is in as much need of instruction as those who are to be taught. The teacher, in fact, has to be taught how to teach, and this will be an important function of the school. It is intended that students taking the course, which will last two weeks, should live in the school, and that in addition to this there shall be a part-time course of a minimum of eighty hours' duration for those who are unable to give their whole time to the work. There will be special courses for industry and special courses for nurses, and medical students will be offered facilities for seeing the work of the school, as they will be the future first-aid teachers. Criticism is levelled against the ease with which first-aid workers have hitherto acquired certificates of proficiency in first aid, and the committtee recognizes that a higher standard of proficiency should be demanded. Not only that, but the first-aid worker is not to be allowed to rest on his laurels and is to be re-examined every two years to see that he is still up to date in his knowledge and efficient in his practice.

While, no doubt, war conditions have fostered the ideas of reform now contemplated by the Birmingham committee, it is but a continuation of ideas which were in being before war broke out. In July, 1939, the British Medical Association issued a report on first aid in industry which put forward a number of important recommendations. The Birmingham committee, as would be expected, has a special interest in the need for adequate first-aid treatment of industrial workers; and that this interest should be shared by the country as a whole is demonstrated by the fact that during 1937 it was estimated that the total charge on industry in respect of industrial injuries was something like £13,000,000.

Here, then, is the beginning of a movement which we hope will be fostered and eventually taken up by

other big cities in the country. If prosecuted with the care and forethought given to it by the initiators it will go a long way towards minimizing and preventing the pain and disability arising from accidents of whatever kind, whether they occur in air raids, on the streets, or in factories.

BRITISH MOSQUITOES AND THEIR CONTROL

Up to recent years, when the importance of mosquitoes in tropical disease has led to a greater diffusion of knowledge about these insects than formerly, most people were under the impression that while there might be "gnats" there were no "mosquitoes" in this country. When, therefore, instances of "mosquito nuisance" were reported they were usually traced in the lay press to accidental introduction of these insects from abroad. In fact, not only are there many species of true British mosquitoes, but the individuals of these species are often sufficiently numerous and active in their blood-sucking propensities to become a nuisance or even a sanitary problem. Thus at certain seasons it may be impossible in the woodlands to rest or enjoy the scenery on account of the pertinacious and blood-thirsty attacks of some day-feeding species, reminiscent of the ubiquitous shade-loving *Stegomyia*, or, as it is now called, *Aëdes aegypti*, of the Tropics. Night-biting species, again, by their interference with sleep and irritating bites, in seaside places especially, are a serious problem to hotel keepers and others whose custom may thereby be affected. To the annoyance of the biting may be added the tendency of the bites to become septic with sometimes serious consequences. In addition the malaria-carrying *Anopheles* are in many parts of the country quite numerous, and even transmission of malaria in times like the present may be brought about where the necessary infection is provided by soldiers and others returning home from abroad. In a few restricted areas entirely indigenous cases of malaria have long been known to occur—a present-day aftermath of the once widely disseminated "ague." Such cases are fortunately very mild, are usually considered by the victims to be colds or chills, but are shown by blood examination to be of true malaria.

Altogether, therefore, it is a matter of some importance that reported instances of "mosquito nuisance," and especially any reported cases of locally arising malaria, have for many years been closely investigated by the Ministry of Health. The results of the large amount of practical information so gained have lately been summarized in an official memorandum under the authorship of Colonel J. A. Sinton, Adviser on Malaria to the Ministry of Health, and Mr. P. G. Shute, Assistant Malaria Officer.[1] After a brief review of the subject of malaria transmission and mosquito nuisance in this country the memorandum gives a complete list of the mosquitoes so far recorded from the British Isles, together with a brief but sufficient description of their habits, breeding places, and methods of control. Twenty-nine species are recorded—four anopheline and twenty-five culicine species—of which latter, however, eight are so rare or so seldom bite man that they may be considered unimportant as causes of public health problems in this country. Of the remaining culicines two belong to the genus *Culex*, eleven to *Aëdes*, three to *Theobaldia*, and one to *Taeniorrhynchus*, the last-named being noted as the most extraordinary of the British mosquitoes, as its larvae and pupae live entirely under water attached to the roots of aquatic vegetation, and so, unlike the larvae and pupae of other species, which must come to the surface to breathe, are very difficult to detect.

The two species *Culex pipiens* and *C. molestus*, which closely resemble each other in appearance, have only recently been recognized as distinct species—an important point, as it is extremely doubtful now whether the former species ever attacks man. The latter is probably the only mosquito which is troublesome in the centre of large towns. It is a most persistent biter, and where it is present in large numbers its bites probably cause a greater indoor nuisance to man than any of the other species of British mosquito. It bites only indoors; the mosquitoes biting in gardens and other places in the open are usually *Theobaldia* or *Aëdes* where they are not *Anopheles*. *Theobaldia* are very large mosquitoes, attacking boldly and giving a very troublesome bite. They are noticeable in many country places, but are especially responsible for mosquito nuisance in urban areas, breeding in water-butts, tins, and almost any collection of water. Their bite is more irritating and results in more swelling than that of any other British species. Most species of *Aëdes* breed in woodland pools. Some, however, breed in open ponds on heaths and commons, or in ditches; one is known to breed only in brackish water near the sea, though it may fly as far as five miles inland, thus recalling the "salt marsh" mosquitoes of some parts of America. This brackish-water species, *Aëdes detritus*, is noted as having been responsible for a greater number of cases of serious nuisance than any other of the British species.

The methods of control, as may be gathered from what has been said, depend very much on the species responsible. On this account much labour and material may be uselessly expended if due attention is not given to identification of the species and knowledge of its habits. Usually it is desirable in serious cases to obtain expert advice, and in a footnote to the memorandum it is said that, if application be made to the Ministry of Health, the local authority can usually obtain the assistance of an expert, who will make a mosquito survey and give free advice on the steps to be taken. The memorandum itself, however, under the heading of "Control" and in notes upon the different species, provides much useful information, including measures that can be taken against the adult mosquitoes as well as those against the larvae, and suitable repellents which can be rubbed on exposed parts of the body such as ankles, wrists, back of neck, and ears, to protect the individual against bites. Altogether this publication represents a most important summary of the whole situation, and should serve as a work of reference to all interested in British mosquitoes, whether from the point of view of natural history, of the public health, or of individuals who may experience mosquito nuisance in this country.

[1] *Measures for the Control of Mosquito Nuisances in Great Britain*, by Lieut.-Colonel J. A. Sinton and P. G. Shute. (Memo. 238/Med. H.M. Stationery Office. 6d.)

CLINICAL TRAINING FOR BRITISH STUDENTS IN AMERICA

In our Parliamentary Notes this week will be found the report of a statement by the Minister of Health in reply to Prof. A. V. Hill on facilities offered by the Rockefeller Foundation for British medical students to pursue clinical studies in medical schools in the United States and Canada. The Minister expressed warm appreciation of this sign of practical sympathy on the part of the Foundation and of the medical schools in America, and undertook to do all he could to further the scheme, which should strengthen the beneficial co-operation in medicine and public health between Britain and the United States and Canada. This welcome offer had its origin in a desire to help medical education in this country during a very difficult time, but it holds out wider possibilities for future and happier days. A strong committee has been formed (with Prof. J. S. B. Stopford of Manchester as chairman and Prof. H. R. Dean of Cambridge as vice-chairman) to select twenty-five to thirty students from among those nominated by the medical schools in Great Britain and Northern Ireland. By this means some of our most promising students will see, and take part in, the inner life and work of the best American schools and hospitals. We understand that the Rockefeller Foundation generously offers free tuition and maintenance on the other side of the Atlantic for a period of one year, which may be extended to two years. No one will be sent to take up a Rockefeller studentship without the approval of his own medical school, and provision will doubtless be made to ensure that a student does not lose ground by reason of his absence. Moreover, as the Minister of Health made plain in reply to a supplementary question by Sir Francis Fremantle, no student chosen for the purpose of continuing his clinical course in America should feel reluctant to leave this country during the war: he can, indeed, be encouraged to regard it as a duty to be undertaken in the national interest and in the cause of medical education. Not more than two of the British students will go to any one institution in the U.S.A. or Canada, and their allocation will be made by the British Committee, whose membership, in addition to Prof. Stopford and Prof. Dean, is as follows: Prof. Hugh Cairns, Mr. H. L. Eason, President of the General Medical Council, Prof. George Gask, Mr. G. F. Gibberd, Dr. A. M. H. Gray, Prof. A. V. Hill, Prof. J. W. McNee, Sir Walter Moberly, and Sir Franklin Sibly, with Mr. W. B. Brander, of the Universities Bureau of the British Empire, as secretary (c/o University College, Gower Street, London, W.C.1).

HOSPITAL WAR SUPPLIES

Hospitals which have been bombed, or find their stocks of clothing, comforts, ward and surgery supplies depleted by the needs of air-raid victims, are now getting much help through the British Red Cross, which is drawing for their benefit upon gifts from friends and workers in this country, the Dominions, and the United States. A small committee of hospital experts, aided by Thomas Cook and Son, has worked out a scheme for bulk distribution of these gifts to "key" hospitals, and these, in turn, are distributing to their sector hospitals. Thousands of cases are now being issued in bulk, or broken up and repacked in necessary quantities. They contain everything a hospital can require for use, from "helpless" shirts to surgical instruments for general and special use. Three thousand complete "bed sets" are coming to hand from the United States. Each consists of three blankets, twelve sheets, eighteen pillow-cases, with appropriate towels, buckets, pitchers, tumblers, even tooth-brushes. Water and instrument sterilizers, bandages and dressings, are also arriving. Bulk reception and distribution to "key" hospitals having been arranged, it now remains for local hospitals to make their applications to their key hospitals, and assist the latter in the sorting and distribution of supplies throughout their sectors.

SULPHATHIAZOLE AND SULPHADIAZINE

It is now becoming possible to assess the value of sulphathiazole in relation to other sulphonamide compounds. An outstanding original claim for this drug was its superior action on staphylococcal infections, and although this has not been altogether borne out by experience with the graver type of case complicated by pyaemia, it is fully supported in the studies of H. F. Helmholz[1] on the susceptibility to sulphathiazole of different bacteria in urine. The drug has also had fairly extensive trials in the treatment of pneumonia, and the experience of I. F. Volini, R. O. Levitt, and H. B. O'Neil[2] is representative. They treated 169 cases of pneumococcal pneumonia with sulphathiazole, and 164 patients, sixty-nine of whom were also given serum, with sulphapyridine: in these two large groups the type distribution, frequency of bacteriaemia, and proportion of patients over 40 years of age were closely similar. The mortalities in the two groups were 5.3% and 4.2% respectively, or a difference of only two deaths. There is in fact nothing to choose between the two drugs in ultimate curative effect. Sulphathiazole brings the temperature down somewhat more slowly, and is said to have a better effect than sulphapyridine in infections by Type II and VII pneumococci, whereas sulphapyridine gives better results in Types I and III. The only important difference in effect between the two drugs is that sulphathiazole is much less apt to produce nausea and vomiting, and patients taking it are therefore much more comfortable. Only seven of these patients experienced these effects, but several had drug rashes and fever. Similar favourable results not only in lobar pneumonia but in bronchopneumonia and pneumococcal bronchitis are described by D. S. Pepper and G. C. Ham[3]; these authors gave particular attention to urinary complications, and found microscopic haematuria in four out of fifty-two cases, while crystals of acetylsulphathiazole were found in the urine of no fewer than twelve. F. W. Sunderman and D. S. Pepper[4] have determined that acetylsulphathiazole is about twice as soluble in alkaline as in acid urine, and advise the administration of alkalis in order to prevent crystallization in the urinary tract.

Meanwhile a new sulphonamide compound has made its appearance in the U.S.A. which seems in some ways to constitute a further advance. This is 2-sulphanilamidopyrimidine ("sulfadiazine"). Careful studies of its toxicity in several animals as well as its therapeutic effects have been made by W. H. Feinstone and others,[5] and a communication by Perrin H. Long[6] to the English medical press contains the assurance that favourable conclusions based on animal experiments have so far been well borne out in clinical trials. Although even less soluble in water than sulphapyridine, sulphadiazine is much more soluble in blood: it is adequately absorbed and reaches blood concentrations considerably higher than those of sulphapyridine. Both because of a low degree of acetylation and because acetylsulphadiazine is more soluble in urine

[1] *Proc. Mayo Clin.*, 1940, **15**, 651.
[2] *Amer. J. med. Sci.*, 1940, **200**, 778.
[3] Ibid., 784.
[4] Ibid., 790.
[5] *Johns Hopk. Hosp. Bull.*, 1940, **67**, 427.
[6] *Lancet*, 1941, **1**, 259.

than other conjugated sulphonamide compounds, there is little reason to fear urinary tract complications; indeed, renal damage in monkeys rarely occurred even when blood concentrations of 20 mg. per 100 c.cm. were maintained for long periods. The general conclusion from Feinstone's experiments is that sulphadiazine is less toxic than either sulphapyridine or sulphathiazole, and on the clinical side Long reports entire absence of nausea and vomiting in eighty treated cases, with one case each of drug fever and drug rash. Sulphadiazine is said to be the equal of other compounds in treating streptococcal, pneumococcal, and staphylococcal infections and to excel in the treatment of infections by Friedländer's bacillus. These authors hesitate to assess relative therapeutic values because the blood concentration attained with sulphadiazine is so much higher. Theoretically this qualification is important; practically all that matters is the therapeutic effect obtainable from adequate but safe dosage. We shall doubtless hear much more of this drug.

BIOLOGICAL EFFECTS OF SHORT RADIO WAVES

That the biological effects of short radio waves are due solely to the heat produced in the tissues and not to any specific action is now generally accepted, thanks largely to the careful work of Dickens[1] in testing the claim that the 3-metre wave-length had a specific effect on cancer. This claim remained unrefuted chiefly because of the difficulty of measuring the actual temperature of the tissues, but by the use of a specially constructed copper-constantan thermocouple and by critical tuning of the transmitter Johnson[2] has now been able to maintain tissues within $\pm 0.1^\circ$ C. of a selected temperature for several hours, both *in vitro* and *in vivo*. Provided that physiological conditions are maintained *in vitro*, the thermal death times can be measured with accuracy, being twenty minutes at 47° C. for both the Walker rat carcinoma and the Jensen rat sarcoma, and three hours at 43.5° C. Jares and Warren[3] found that the thermal death time at 41.5° C. was about thirteen hours, while temperatures below this had little destructive effect. This temperature can be maintained in the human subject for perhaps twelve hours without a fatal result, although Warren[4] has not so far maintained it for longer than five hours. Johnson shows, however, that the thermal death times *in vivo* for the rat tumours were about twice as long as *in vitro*, being six hours for the Jensen sarcoma at 43.5° C. There was, moreover, a difference in susceptibility to heat *in vivo* which was not present *in vitro*, the Walker rat carcinoma being twice as resistant as the Jensen rat sarcoma. There are several differences between the action of heat and that of *x* rays, as the radio-sensitivity of malignant growths is usually much greater *in vivo* than *in vitro*, while the histological changes resulting from heat bear no resemblance to those due to *x* rays. Johnson also found that while heating *in vitro* for the thermal death time resulted in failure to "take" on transplantation, there was no cessation of metabolic activity. This observation may be the explanation of Warren's clinical experience of artificial pyrexia—that while definitely destructive to the tumour it did not prevent its rapid recurrence. In Johnson's experiments also there was usually a swelling of the tumour of about 30% immediately after heating, which persisted for some twenty-four hours and might well be a danger clinically. His conclusion is that there is as yet no evidence that malignant tissue is more susceptible to heat than normal tissue, but the occasional regression of a tumour in man following an acute febrile illness and the successful use of toxins by Coley in the treatment of bone sarcoma must be borne in mind. A combination of *x* rays and heating was being tried by Schinz before the war, but the skin tolerance to *x* rays is definitely reduced by heating, so that what might be gained by the added destructiveness of heat on the tumour may be lost by the lowered *x*-ray dose possible without damage to the skin. There are many problems in the heating of tissues well worth investigation, and Johnson's paper has cleared the ground ready for clinical research.

[1] *British Empire Cancer Campaign, 14th Ann. Rep.*, 1937, 112.
[2] *Amer. J. Cancer*, 1940, **38**, 533.
[3] *Amer. J. Roentgen.*, 1939, **41**, 685.
[4] *The Treatment of Cancer*. Edited by Pack, G. T., and Livingstone, E. M. P. Hoeber, New York, 1939, p. 2539.

SURGICAL TREATMENT OF ANGINA PECTORIS

The attainment of precision in our conceptions of the nature of a disease rarely fails to stimulate therapeutics. The accumulation of evidence for the theories that the pain of angina pectoris is due to the accumulation of pain-producing substances released by an imperfectly oxygenated myocardium, and that in angina of effort the essential anatomical lesion is narrowing of the coronary artery, has led to several attempts to improve the condition by surgery. Attempts to remedy the fundamental disturbance in the arterial supply to the heart muscle have been made by Beck[1] and O'Shaughnessy,[2] the former grafting pectoral muscle and the latter omentum to the heart. Both operations appear to provide new collateral vessels to the myocardium, and published case reports indicate some improvement in the clinical condition of the patients; but it is not yet known to what extent these operations lengthen life. Mansell[3] reported in 1940 that seven of O'Shaughnessy's original fifteen patients were dead. Another operation which has not yet passed the experimental stage is proposed by Fauteux[4] of Montreal, who has found in dogs that the high mortality from resection of the ramus descendens of the left coronary artery is reduced by previous ligature of the vena magna cordis; he proposes venous ligation to prevent subsequent attacks of coronary infarction and to relieve angina of effort in man. This operation is an example of a practice in surgery based on a principle which is not recognized by orthodox physiology; for while every physiologist would agree that venous ligation increases venous and capillary pressure, it is difficult to see how it accelerates blood flow, which is one of the effects claimed. A rather different approach to the relief of angina is to interrupt the sensory nerves carrying the pain impulses from the heart by removing the upper thoracic sympathetic ganglia or by injecting them with alcohol. Successful operations yield results that appear to be eminently satisfactory in relieving anginal pain, and there is no evidence that the patient who is deprived of the warning to limit his activity lives a shorter time thereby. But there are few cases of angina in which the pain is unilateral and in which interference with the nerves on one side suffices to abolish the pain. The operation is an extensive one, and the alternative alcohol injection, unless performed most skilfully, is apt to be followed by intractable intercostal neuralgia. Finally we come to an operation the basic principle of which remains comparatively obscure—namely, total thyroidectomy. This was introduced by Levine and Blumgart to relieve congestive failure, and was based on the well-known benefits conferred on the heart in Graves's disease by subtotal thyroidectomy. It aims at reducing the

[1] *Surg. Gynec. Obstet.*, 1937, **64**, 270.
[2] *Lancet*, 1938, **1**, 76.
[3] *Proc. roy. Soc. Med.*, 1940, **33**, 542.
[4] *Surg. Gynec. Obstet.*, 1940, **71**, 151.

cardiac work by diminishing the basal metabolic rate, which after operation can be maintained at the desired level by administration of thyroid. Although it has now largely been abandoned as a therapeutic measure for congestive failure in the absence of hyperthyroidism, it survives in the treatment of angina of effort, and published series of cases suggest that it has been of real benefit in many. Thyroidectomy was thought at one time to relieve angina by intercepting the sensory paths, but it seems more probable that the results are directly or indirectly due to removal of thyroid secretion, as in many patients relieved by operation pain recurs if too much thyroid is given.

The reader of most of the original papers dealing with cardiac surgery is apt to emerge with a confused idea of what these operations do and of when they should be employed. That there is doubt as to the effects of these operations is regrettable. Every therapeutic measure constitutes an experiment. Results can in many instances be assessed with considerable accuracy, and in few more accurately than in angina of effort, for in this disease Wayne and his colleagues[5] showed that the amount of exercise, performed under standard conditions, which is necessary to produce pain is remarkably constant; it is therefore a simple matter to demonstrate what measures increase and what diminish exercise tolerance. Repeated exercise-tolerance tests under standard conditions could scarcely fail to throw new light on the precise effects of these various operations. As to their place in the treatment of angina, most would agree with Sir Maurice Cassidy in his remarks concluding a discussion on the subject at the Royal Society of Medicine[6]: "As I tell all my anginal patients, this is a much-maligned disease. We are impressed by those unfortunates who succumb to or are crippled by coronary infarction; we forget those very numerous patients who live to a ripe old age in spite of their angina, or die from some other disease. Some of them in fact cease to have angina; others learn so to regulate their lives as not to be worried by anginal pain. Nevertheless, I agree that there is a limited scope for surgery in the treatment of this disease." In our present state of knowledge the most suitable patients are those whose lives are rendered excessively difficult by restricted exercise tolerance or unbearable by repeated attacks of severe pain at rest. Choice of operation will be determined to some extent by the nature of the surgical skill available, but should become a simple matter as experience accumulates.

EOSINOPHILS IN THE DIAGNOSIS OF RESPIRATORY ALLERGY

The relation of eosinophils to hypersensitive states, in both man and laboratory animals, has for many years attracted the attention of clinicians and pathologists. In the laboratory, guinea-pigs and dogs are most commonly used for the study of induced protein hypersensitivity or anaphylaxis. Both species may show an increase of eosinophils in the circulating blood or internal organs during anaphylactic shock. The symptoms of acute anaphylactic shock closely resemble those which follow the injection of histamine, and probably depend on the liberation of histamine-like substances from the tissues of the test animals. This has been substantiated by the demonstration that the blood histamine is increased during acute anaphylactic shock.[7] That the eosinophilia and increased blood histamine may be intimately related is suggested by the high histamine content of eosinophils as compared with the other cellular and fluid constituents of blood.[8] These findings make it probable that eosinophilia can be regarded as an aid to the diagnosis of an anaphylactic reaction in so far as it denotes an excessive liberation of histamine. Although it is dangerous to draw analogies between anaphylaxis in laboratory animals and allergy in man, it is probable that the symptoms of both these hypersensitive states depend on the same mechanism. Eosinophilia in the blood and tissues of cases of suspected allergy can therefore be regarded as a valuable aid in the diagnosis providing it is combined with a thorough clinical investigation and the final diagnosis is made on the demonstration of an abnormal sensitivity. An increase of eosinophils in the blood and bronchial secretions is already well recognized as an aid in the diagnosis of asthma. In hay-fever, blood eosinophilia has been found less regularly, but the presence of eosinophils in the nasal secretion has been observed and used as a diagnostic sign. In a paper for which the author was awarded the Casselberry Prize of the American Laryngological Association for 1940, French[9] reports on a series of some 2,000 cases of nasal allergy in which the diagnosis was based on a cytological study of the nasal secretions together with a thorough clinical investigation, including hypersensitivity tests. In many cases repeated examinations were made, and from the collected data the author was able to correlate cytological findings in the secretions with the pathological condition of the nose and accessory sinuses. He deduces from this that the presence of eosinophils in significant numbers is evidence of an allergic state; a large preponderance of polymorphs, on the other hand, indicates an acute inflammatory complication or the stagnation of secretions. The findings suggest that in the diagnosis of common diseases of the nose and paranasal sinuses a cytological examination should be regarded as essential, and would ensure greater accuracy in the diagnosis of allergy. The recognition of the allergic basis of many common inflammatory and hyperplastic conditions of the nose would result in a reduction in the number of unnecessary surgical operations.

[5] *Clin. Sci.*, 1933, **1**, 287.
[6] *Proc. roy. Soc. Med.*, 1940, **33**, 543.
[7] *Amer. J. Physiol.*, 1938, **123**, 40.
[8] *J. Physiol.*, 1937, **90**, 485.
[9] *Ann. Otol. etc.*, St. Louis, 1940, **49**, 579.

The *Bulletin of War Medicine* for January, the third one issued by the Medical Research Council, well sustains the excellent standard of the previous two issues and should be indispensable to all those engaged in meeting the various medical and surgical problems of war. The current volume opens with a summary of the Conference on the Treatment of War Wounds which was organized by the War Wounds Committee of the Medical Research Council last November. Then follow seventy pages of detailed abstracts of various articles relating to war medicine that have appeared in the world's medical literature. It may be noted that there are, in addition to the usual sections, short sections on industrial hygiene, food and drink, general sanitation, and organization.

The announcement of the retirement of Dr. H. A. Macewen from the post of Senior Medical Officer of the Ministry of Health will be received with very real regret by the members of the Public Health Service of the country. His work, especially during recent years, brought him into close official contact with many medical officers of health, to whom he became friend and adviser. Dr. Macewen covered a wide range of subjects in his official capacity, including control of infectious diseases, isolation hospitals, water supplies, sewage disposal, port hygiene, and surveys of the health services of local authorities. His knowledge of all branches of public health work is encyclopaedic.

REGIMENTAL MEDICAL PRACTICE

BY

HARRY POZNER, M.R.C.S.

Captain, R.A.M.C.

It is often asserted that when a doctor joins the Services he exchanges his stethoscope and clinical acumen for a sword and a uniform. That this impression is entirely erroneous has readily been appreciated by many general practitioners who accepted emergency commissions on the outbreak of war. Indeed, the scope of the regimental medical officer is surprisingly wide and comprehensive. There are certain factors which give the Service doctor a new angle, as it were, on medical practice. First, in a unit which may contain approximately a thousand men there are few, if any, cases of chronic disease. The problems with which one meets are almost entirely those of preventive medicine and administration. Among the many functions which the R.M.O. has to assume are those of medical adviser to the commander of the unit to which he is attached, medical officer of health, sanitary inspector and engineer, and, above all, that of a medical educator. There are in addition unique opportunities for clinical observation and for experiments in preventive and therapeutic medicine.

The time which any unit has to spend in action is small compared with its sojourn in rest camps, barracks, and billets, and it is to the consideration of the commonest ailments met with under these conditions that I shall devote the rest of this short article.

General Considerations

The numbers of men on sick parade naturally vary from day to day and from season to season, but from the records which I managed to keep for about a year, both in England and abroad, certain facts have emerged. The sick rate in any unit of which I have been medical officer has, with one exception, never exceeded 2½% of the total strength. This one occasion occurred in the mid-winter of last year, when a short but particularly virulent type of influenzal epidemic swept through the troops in Southern England and brought about a daily sick rate in my unit of from 3 to 9%. It also gave most of us a salutary lesson in the principles of preventive medicine. Changes in the medical officer and the moving of a unit from one area to another invariably cause an increase in the number of men reporting sick. Malingering—a beloved tradition in the old armies—is now, I believe, fast disappearing, and I have been very fortunate in meeting few of these cases. Many of these men, who previously had been cursorily diagnosed and dismissed as "lead-swingers," present genuine psychological problems, and they react satisfactorily to firm but sympathetic treatment.

Surgery

In surgery the scope of the R.M.O. is naturally limited in regimental practice to diagnosis and the minor practical procedures. Acute pyogenic infections can be treated adequately at regimental detention quarters and camp reception hospitals, and the increasing use of sulphonamides and the tendency towards conservative measures have produced the most favourable results.

The surgical armamentarium of the regimental doctor is small, but it is entirely adequate for his purpose. In the past year there have been many improvements, and to-day the field medical pannier contains a compact roll-up case of surgical instruments, a convenient efficient sterilizer, and, among other refinements, an electric auriscope.

Apart from accidental injuries, the commonest cases met with in my experience are orthopaedic problems. Injuries to bones are frequent, and recently I have had a series of six cases of fracture occurring in the region of the wrist. As with all bodies of young and athletic men, there have been the usual cases of internal derangement of the knee-joint, and where it has been deemed expedient these have been recommended for operation.

Acute abdominal conditions are rare, but they do occur, and often at the most inconvenient times. This was impressed on me during the advance through Belgium, where in the space of a week there occurred one case of acute appendicitis and two cases of perforated gastric ulcer which had previously given no symptoms. This suggested an interesting problem whether there was any connexion between the imminence of the battle and the onset of the acute conditions.

During the "blitz" and in coastal defence work there have been opportunities of treating wounds due to machine-gun fire and bomb fragments. These have all done very well when treated on the principles that have been so clearly defined by Ogilvie in his papers on war surgery. Burns of first and second degree react well to tannic acid jelly, and it is hoped that one may have the chance of testing the efficacy of silver nitrate and gentian violet in such cases. Minor surgical conditions such as haemorrhoids and sprains are frequent, and the treatment of these is on routine lines.

After the return of the B.E.F. many men reported sick with chronic suppurative otitis media, dating in the majority of cases to some heavy bombardment to which they had been subjected. These were long and tiresome cases, but it was found that they could be treated satisfactorily in the unit M.I. room by a preliminary gentle cleansing with a mixture of surgical spirit and distilled water and subsequent insufflation with iodine powder.

Before leaving this short account of regimental surgery I would like to express my appreciation of the surgeons attached to the local E.M.S. hospitals I have had occasion to use. They have always been willing and generous in their co-operation, and I have learnt much from watching their progressive technique.

Medicine

The field of regimental medical problems is extensive and provides a wide variety of cases. The therapeutic agents at the disposal of the R.M.O. are of necessity limited in number, but they are reliable and have withstood the tests of long usage. Indeed, the experience gained in employing only a small number of medicines has proved valuable at the present time, when medical supplies of unnecessary drugs have been diminished by the war.

In any well-managed unit the amount of chronic sickness is very small, and tends to be typical of that unit. For example, in any detachment of men in the Pioneer Corps—a body of more elderly soldiers—one invariably finds cases of chronic bronchitis and of arthritis. Regular battalions which have seen service in the East generally possess a case of malaria or of dysentery. But in the main the ailments demonstrated differ from those found in civilian practice only in the diseases peculiar to any large body of men who are forced to live in close proximity, sometimes under poor and unhygienic conditions.

Preventive medicine should be the constant guiding light of any R.M.O., and it is perhaps due to the realization of this that in the winter of last year were averted epidemics of cerebrospinal meningitis that might have proved disastrous. It must be persistently emphasized to commanding officers that the effective isolation of one man with a cold may prevent the unit from being decimated by a disabling illness. In every battalion there are now regimental detention quarters, where a man with a cold and a high temperature may be kept isolated and under observation for forty-eight hours.

Medical abdominal conditions are common, and one sees a number of cases of acute gastritis and peptic ulceration. The greater part of these do very well under the routine hospital treatment; but it has been observed that there is often an associated psychoneurosis. The stock complaints of the Army—constipation and its concomitant diarrhoea—are still in evidence, and much is being done, on the lines of investigation into diet and the bacteriology of food poisoning, to eliminate these conditions completely.

Perhaps the two chief problems which confront the R.M.O. are those of scabies and impetigo. Scabies may appear sporadically in a unit, especially when it has moved to another area, and the efficient control of its spread may often be an urgent question. Immediate disinfestation of clothes and blankets is of paramount importance, but the treatment of the individual has passed through many phases. The evolution of the treatment of scabies has seen the temporary popularity of sulphur ointment, Marcussen's ointment, sodium thiosulphate, and dilute hydrochloric acid, and now interest is being concentrated on the use of benzyl benzoate. With the latter some good series of results have been obtained, with very few instances of recurrence. Impetigo, although not disabling, is disfiguring, and takes a course which is long and tedious, both to the patient and to the doctor. Here again many methods, such as a weak solution of acriflavine, or mercury and ammonium ointment, have been tried. I have found that many cases react quickly and favourably to certain proprietary streptocidal preparations, and more recently to a 2% aqueous solution of gentian violet. Pediculosis, even on active service, is no longer the bugbear that it was formerly.

Certain nervous problems peculiar to the circumstances of this war have often presented themselves. These conditions, which are mostly anxiety neuroses, I have found in the older men employed in pioneer work, and in younger men who are stationed in isolated coastal defence areas. The predisposing factors have commonly been worry about bombed-out evacuated families, and also the continuous nervous tension of waiting for "something to happen." A careful and accurate investigation and subsequent treatment by suggestion and encouragement have in most cases resulted in great improvement.

Abroad I saw a few cases of war hysteria. These exhibited two main syndromes. The first was automatism, and the patient tended to reproduce his actions and emotions prior to evacuation. The second and much more noticeable group was the one which exhibited facial immobility, hunched shoulders, and muscular rigidity, conditions remarkably comparable to those of Parkinsonism. These men were easier to handle, and in some instances were able to return to their normal duties after a short period at the regimental aid post.

Venereal disease, in my experience, is decidedly on the decrease. This is probably due to a wider spread of knowledge on the subject, the better education of the soldier, and the encouragement of prophylaxis. Practically all the cases I have seen are of gonorrhoeal urethritis, and have generally been relapses of an infection incurred before the war.

Active Service

No rules can be laid down for the conduct of the R.M.O. on active service. Each battle presents its own difficulties. The increasing trend towards more mobile warfare leaves the doctor further behind, and there must necessarily be a greater time-lag between the time a man is wounded and when he is seen by an R.M.O. It is not necessary to elaborate on the problems which confront a doctor in the front line, but attempting the minimum amount of emergency surgery in a shell-battered estaminet with the aid of two candles and few amenities is something to be personally experienced before it can be fully realized. With his functions so constrained in battle, he must become an expert in preventive medicine before a campaign, and during it be a constant source of encouragement to the men.

The R.M.O. holds a peculiar position. Although only attached to a unit he is as much an integral part of it as the commanding officer or the newest recruit. Correspondingly, he must identify himself with its aims and traditions. If he is to mean anything at all to a unit he must as a trained professional man mean everything that is decent and steadfast and sane.

I am indebted to Colonel J. C. Dowse, A.M.S., for permission to publish this article.

Nova et Vetera

SOME TEXTBOOKS OF FIFTY YEARS AGO

[FROM A CORRESPONDENT]

The other day I took down from its shelf an old favourite bought fifty years ago—namely, a first edition of *Life's Handicap*, published early in 1891, when Kipling was, I think, 25 years old. For no reason I can explain, after reading two or three of the stories, old friends, I began to turn over the leaves of the publisher's (Macmillan's) advertisements at the end of the book. Here, sandwiched between all kinds of other publications—hosts of sermons, editions of Greek and Latin classics, forgotten minor poetry, stacks of instructional and devotional works, and a certain number of novels (William Black, Marion Crawford, Thomas Hardy, Henry James, Bret Harte, Rolf Boldrewood, Charlotte Yonge, and others)—were quite a number of medical works: evidently the output of textbooks was a less specialized business then than it is now.

The first I lighted upon, going through them alphabetically, was Dr. T. Clifford Allbutt on the ophthalmoscope, then, we may suppose, a toy with which few general practitioners had any great familiarity. McCall Anderson's *Lectures on Clinical Medicine* comes next, of somewhat lesser interest, one imagines. Then follows Richard Barwell on *Curvature of the Spine*; and on *Aneurysm, especially of the Thorax and Root of the Neck*: possibly the former may be less "dated" than the latter. Next is Charlton Bastian on *Paralysis from Brain Disease*, no doubt still well worth reading, for he was an acute observer. Lauder Brunton is represented by six publications, three of them on pharmacology, therapeutics, and materia medica: these were still being read several years later. Bucknill on *The Care of the Insane* is perhaps forgotten by now—I do not remember ever hearing of it, though it may have been a useful work once. Brudenell Carter's *Diseases of the Eye* was a landmark in its day, and he is also represented by two smaller books on *Eyesight* and *Operations for Cataract* respectively. Carter was one of the first ophthalmic surgeons who practised as pure specialists in this country. He served as a surgeon in the Crimean War, and was a leader-writer on the staff of the *Times* for fifty years.

Cholera Epidemics in East Africa, by J. Christie, makes one think a little: Kenya and Tanganyika were in their earliest infancy, and the places where these epidemics were studied may have been Zanzibar, Mombasa, Beira, Quilimane, Sofala, and other coastal settlements. Michael Foster's *Physiology* had reached its fifth edition—stiff reading for beginners; Foster and Langley's *Elementary Practical Physiology* (a better book from the medical student's point of view) was already in its sixth edition. Dr. J. M. Fothergill was the author of three books, two on treatment and one on invalid diet: one was in a second and one in a third edition, so they were certainly being bought. Wilson Fox on *The Artificial Production of Tubercle in Animals*, and on *The Treatment of Hyperpyrexia*, sounds more interesting than W. H. Griffiths on *Prescriptions and the Art of Prescribing*, which, possibly quite wrongly, suggests the elegant mixture of some twenty or thirty ingredients, all perfectly useless but with not an incompatible amongst them. Hamilton on *Pathology*, vol. i, 25s., was evidently a textbook on the grand scale for those days, when pathology was not such a veteran science as it is to-day. Dr. Sophia Jex-Blake's *Care of Infants* would probably be nearly as useful to-day as it was half a century ago—doubtless many of the middle-aged in our profession were brought through early troubles by its use. *Klein on Micro-organisms* was in its third edition—a good book at the time too. J. A. Lindsay's *Climatic Treatment of Consumption* would probably not be of much value to this generation, though Sir Morell Mackenzie's *Hygiene of the Vocal Organs* may still have valuable lessons (it had got to a seventh edition). Surgeon General W. C. Maclean was the author of a *Textbook of Tropical Diseases*, soon to be eclipsed by Patrick Manson's classic, one may presume. More interesting are Henry Maudsley's *Physiology of Mind*

and *Pathology of Mind*, the latter more expensive than the former and doubtless larger. Charles Mercier (did any medical author ever write purer or more limpid English?) is represented by *The Nervous System and the Mind*, still a mine worth prospecting, one feels sure. Lauder Brunton, Donald MacAlister, and Mitchell Bruce were editing the *Practitioner* (then published by Messrs. Macmillan); Russell Reynolds, a *System of Medicine* in five volumes. Benjamin Ward Richardson was writing on alcohol, on sanitation, on hygiene, and on preventive medicine; Sibson's collected works were on sale in four volumes at three guineas. The *International Encyclopaedia of Surgery*, in six volumes, was edited by J. Ashhurst, jun., professor of clinical surgery in the University of Pennsylvania. Last, but very very far from least, is W. Hale-White's *Textbook of General Therapeutics*. I wonder whether Sir William still has a copy of it in his library?

RAMAZZINI AND INDUSTRIAL DISEASE

Ramazzini (1633–1714) was well known as a doctor at Modena, in Italy, who late in life became a professor of medicine at Padua. He wrote in 1700 *De Morbis Artificum*. Working among his patients at Modena he was attracted by the miserable condition of the wretched class whose duty it was to empty the cess-pits of the houses in the city. These cess-pits were only emptied once in three years, and he found that the men could only work four hours a day and were invariably ill. This led him to inquire into the industrial diseases in other groups of workers and thus led to the production of a book of great interest, often pillaged by other writers without acknowledgment. The second edition appeared in 1713. It is now published under the auspices of the library of the New York Academy of Medicine.[1] Written in Latin, it is translated by Mrs. Wilmer Cave Wright, Emeritus Professor in Greek in Bryn Mawr College. Her English translation faces each page of the Latin original. It is fluent and accurate. She has prefixed an excellent introduction, has appended notes, and given two indexes.

It is interesting to notice how such a book, on industrial diseases, written in the eighteenth century, differs from modern ones. Some of Ramazzini's observations were made from personal knowledge, others he knew only by report. He was widely read in the classics and quotes freely from Hippocrates, Pliny, and Galen. Although he is accurate in many points he was credulous, making little attempt to verify the opinions expressed by the ancients. He makes no allusion to such a condition as anthrax, but he lays stress on the effects of lead and mercury. The whole book reminds one a little of Burton's *Anatomy of Melancholy*, and may be read with profit and pleasure by the general reader as well as by those who desire to ascertain what was known of industrial disease at the time it was written.

[1] *De Morbis Artificum. Bernardini Ramazzini, Diatriba. Diseases of Workers.* The Latin text of 1713. Revised with Translation and Notes by Mrs. Wilmer Cave Wright. (Pp. 534. 30s. net.) Chicago: University of Chicago Press. 1940.

At a recent meeting of the Section of the History of Medicine of the Royal Society of Medicine, with its President, Sir Walter Langdon-Brown, in the chair, Dr. J. D. Rolleston read a paper on the medical aspects of Saint Simon's Mémoires, which covered the last twenty-four years of the reign of Louis XIV and the eight years of the Regency (1691–1723). He discussed the subject under the three headings of prevalent diseases, of which the most important were small-pox, malaria, syphilis, tuberculosis, gout, nervous and mental disorders, alcoholism, fistula in ano, and stone in the bladder; descriptions of contemporary physicians and surgeons, especially Fagon and Maréchal; and miscellaneous topics including longevity, sexology, spas, poisoning, post-mortem examinations, and the illnesses of Louis XIV.

Local News

ENGLAND AND WALES

Retirement of Islington M.O.H.

Dr. G. Clark Trotter has retired from the position of medical officer of health for Islington after nearly twenty years in the service of that borough. Previously he had been medical officer of health for Paisley and for Deptford. At a recent meeting at Islington town hall the mayor, on behalf of the staff of the public health department, presented Dr. Clark Trotter with an electric wireless set, and he and the mayoress also made a personal gift of books. The ceremony was presided over by Dr. V. Freeman, Dr. Clark Trotter's successor, who remarked that during the tenure of the late medical officer the infant mortality of Islington had fallen from 130 per thousand births to 60, while reforms such as slum clearance and the stopping of food adulteration owed much to his initiative. Speeches were also made by the chairman of the public health committee, the deputy medical officer of health, and the superintendent of the public health department. In acknowledging the compliments paid him Dr. Clark Trotter said that the work of the health department of such a large borough was by no means a one-man job, and without the support of his loyal colleagues he could not have carried through.

The Air-raid Shelter Problem

Lord Horder presided at a meeting of the Royal Empire Society on March 4, when Mr. T. L. Tanner, chairman of the Friends Ambulance Unit, spoke on the shelter problem. The position with regard to shelters, Lord Horder said, still remained not entirely satisfactory. The policy of his committee had been a dual one—a short-term policy aiming at rectifying the errors of last September, when the need for dormitory shelters suddenly arose, and a long-term policy summed up in the single word "dispersal." By dispersal he believed the maximum of safety and of hygiene could be obtained. He had been accused, he said, of stating that there was no such thing as an ideal shelter; what he had said was that there was no ideal large public shelter. But however satisfactory the small shelters (Anderson and domestic) might be, the persistent preference of people for the public shelters must be considered. These public shelters had become the framework of a new social existence. A strange thing, as Lord Horder commented, that an active communal life should start underground in conditions so primitive that it was a struggle to get any sanitation established. He hoped that one of these days a new turn in the war would make the whole of this troglodytism unnecessary. But the fact must be faced that there was a hard core of people who believed implicitly that public shelters were safer than they really were and as offering a more comfortable existence than anything above ground. Care must be taken, said Lord Horder, that underground slums were not created, that the casual shelterers, having passed through the transition stage of the dormitory shelter, did not become the inhabitant of an underground slum. He referred to some large underground shelters he had seen in the Provinces, with conditions worse than anything in London. The saddest spectacle was the children. It was all very well to say they should not be there at all, but the distrust of reception areas by their mothers must be reckoned with. Lord Horder still felt that dispersal was the best policy, but it took time to unload these large public shelters, and in the meantime the people who stayed in them must be kept safe and healthy and with as much spiritual happiness as possible.

Mr. Tanner said that overcrowding in the shelters had diminished both as a result of the provision of new shelters and still more the reduction in the frequency and length of night raids. There had been cases of cerebrospinal fever and measles and whooping-cough which might be attributed to shelter conditions, but as yet no large-scale epidemic. He thought there was room for improvement in the organization of doctors' rotas, and that sometimes the visits made by

doctors were perfunctory. The late Minister of Health had announced the setting up of medical aid posts and isolation wards. The former had been installed in shelters of over 500 capacity, but in many instances isolation wards were not to be found. While alive to the disadvantages of a large public shelter (the published reports of early shelter conditions were in no way exaggerated), Mr. Tanner pointed out that there was something to be said now on the other side, especially the opportunities for providing good food and food-education and recreational facilities and the fostering of a community spirit.

Correspondence

Abdominal Hyperaesthesia in Dyspeptics

SIR,—I am sorry that Captain W. G. Mills should have attempted to revive in your issue of March 1 (p. 315) a method of diagnosis which had been allowed to fall into well-merited oblivion for twenty years. I believe that cutaneous hyperaesthesia as a sign of organic disease of the stomach is quite valueless, and that when it is found it has invariably been produced by the unconscious suggestion of the observer. From the time when, as a student in 1903, I first read Head's work on the association of cutaneous hyperaesthesia with visceral disease I mapped out his areas in every case I saw in which an ulcer had been diagnosed. I watched its retraction from day to day until it finally disappeared, when it was assumed that the ulcer had healed. In 1909 I examined nine patients with duodenal ulcer the day before they were operated upon by Moynihan. Greatly to my surprise I failed to discover hyperaesthesia in any of these phlegmatic middle-aged Yorkshiremen. I soon realized that the cases I had previously examined were mostly highly suggestible chlorotic girls, who were not suffering from chronic ulcer at all. Since 1909, by taking care to avoid suggestion, I have never observed cutaneous hyperaesthesia in any of some hundreds of cases of ulcer. On the other hand, I have often suggested an area of hyperaesthesia away, replaced it by anaesthesia, or transferred it to the opposite side after it had been marked out by one of my clinical clerks.

It is curious that in the last war cutaneous hyperaesthesia over the heart was regarded by some physicians as evidence of D.A.H., a *functional* disorder, in contrast with Captain Mills's hyperaesthesia sign of *organic* gastric disease. The precordial hyperaesthesia, like the cutaneous hyperaesthesia over the shins, described by one medical officer as pathognomonic of trench fever, proved to be the product of the observer's own unconscious suggestion.

The remarkable suggestibility of the average soldier was demonstrated in 1918 by the discovery of anaesthesia of the pinna of the deaf ear in eighteen out of twenty-eight otherwise fit soldiers with unilateral organic deafness, compared with one out of nine civilians.[1]—I am, etc.,

Oxford, March 1. ARTHUR HURST.

Hyperventilation and the Effort Syndrome

SIR,—Drs. E. Guttmann and Maxwell Jones, in their article on hyperventilation and the effort syndrome (November 30, 1940, p. 736) have questioned the theory that hyperventilation plays a role in the cause of the symptoms of the effort syndrome. As the originator of this theory (that effort syndrome represents an anxiety state with hyperventilation), I feel that a letter justifying my beliefs is warranted.

Most interested observers will agree that effort syndrome results from anxiety (fear) plus exertion under conditions of stress and strain. In my own experience those patients sent to me with this diagnosis made by impartial physicians invariably have had anxiety states and have had their major symptoms reproduced by voluntary overbreathing, even though they were not aware of the reason for going through this test. Most of these patients re-experienced their symptoms after doubling or trebling their respiratory volumes for one to three minutes or so, and in turn were relieved by breathing 2 to 5% carbon dioxide (mixed with pure oxygen or with 21% oxygen and 77 or 74% nitrogen respectively) for thirty to sixty seconds. When occasionally most but not all of the symptoms were reproduced by this procedure, it seemed to be due to the fact that sympathetic or parasympathetic stimulation, or both, had played a part in their spontaneous attacks. In our original publication (Soley, M. H., and Shock, N. W., *Amer. J. med. Sci.*, 1938, **196,** 840) these latter factors were not considered adequately, and they probably play a greater part in effort syndrome than we originally supposed. Of course, hyperventilation and sympathetic and parasympathetic stimulation can all arise from central nervous system overactivity caused by fear, anger, and other emotions. I believe that combinations of these responses to anxiety account for the variations in the clinical picture called the "effort syndrome."

If one considers palpitation and tachycardia only as effort syndrome, then it is obvious that these symptoms will not be caused alone, or even at all in some patients, by hyperventilation, since they are probably direct sympathetic effects or are partially mediated through the secretion of the adrenal medulla. But if one includes those symptoms described by Sir Thomas Lewis and Paul D. White as being characteristic of effort syndrome, then hyperventilation alone or with sympathetic and parasympathetic effects will produce this syndrome.

The rate at which the patients overbreathe is very important, since with too rapid a loss of carbon dioxide through the lungs the patients fail to experience the symptoms which appear following less rapid loss of carbon dioxide. In our first trials with hyperventilation we often made this error of hyperventilating patients too rapidly.

Inasmuch as effort syndrome is of such importance in the armies of both Great Britain and the United States, as well as in civil populations, any information which ultimately leads to the discovery of its aetiology should be a worth-while contribution.—I am, etc.,

MAYO H. SOLEY, M.D.,
Assistant Professor of Medicine and Pharmacology.

University of California, Feb. 8.

Trichiniasis in Britain

SIR,—In addition to the two Pembrokeshire outbreaks (1922 and 1939) mentioned in his letter of February 20 by Dr. Gillam, there was trichiniasis in a household near Swansea in June, 1930, affecting four persons acutely and one in very mild form. I investigated the outbreak in conjunction with Drs. Joseph Lloyd and J. Lloyd Davies and with officers of the Welsh Board of Health and the Swansea Public Health authority, and it was decided that a ham (purchased locally but probably originating from a Midland firm of wholesalers) was the source of the infection, though complete proof was lacking.

There was some evidence that the rapidity of swelling of the eyelids was correlated with the degree of severity of the disease.

Case	Swollen Eyelids	Severity	Eosinophils per c.mm.
A	13th day	Very severe	2,722
B	13th ,,	Severe	5,376
C	15th ,,	,,	2,976
D	20th ,,	Moderate	1,800
E	Not seen	Very mild	1,000

In all cases the cell counts were made on the twentieth day after ingestion of the suspected ham. Although careful search for other cases in the district was made by the health authorities none was found, and ultimately all the patients recovered.—I am, etc.,

Swansea, March 3. A. F. SLADDEN.

Scabies

SIR,—I was interested in Dr. Bigham's letter on scabies in the *Journal* of February 22 (p. 294). In this district also scabies is endemic, but of late has assumed major epidemic proportions. Several factors have almost certainly contributed to the wide and rapid spread of the contagion. For example, it is known that Service men come home on leave while

[1] Hurst, A. F., Symns, J. L. M., and Gainsborough, R. (1918), *Seale Hayne Neurological Studies*, **1**, 19, London. See also Hurst, A. F. (1920). *Croonian Lectures on the Psychology of the Special Senses*, p. 50, London.

infested. Crowding of persons together in air-raid shelters and a certain influx of people from other areas have greatly favoured the rising incidence of scabies.

The usual means of dealing with scabies by treating children at clinic baths and instructing mothers is not only inadequate but, in the vast majority of cases, a futile expression of hope. Formerly it was at least possible to keep the disease in check by such methods. To be of any value in present circumstances treatment must be extended not only to children but to the other members of households, most, if not all, of whom will be found infested. Herein lies the greatest difficulty. Post-school and adult persons do not often seek treatment for scabies in its early stages. It has been found that when they do the family doctor's instructions are disobeyed, particularly where staying off work is included in orders. In this area a large proportion of houses lack bathing facilities. Chemists are not infrequently consulted, and they supply sulphur ointment and advice. In some instances one or more members of a family may attain a state of partial or almost complete cure for a short time, but a vicious circle of reinfestation from kith and kin is kept going and we find a more or less chronic form of scabies. This is very often complicated by infection resulting in severe impetiginous or other septic sores. In my opinion the additional bathing and washing facilities afforded by decontamination stations will in no way relieve the situation. In my view hospitalization of whole families is the most efficient and, in the long run, by far the least costly way of dealing with scabies. Some areas may be fortunate enough to have available for this untenanted small-pox hospitals which could be utilized.

Victims of scabies lose sleep and rest—a state of affairs seriously affecting the working capacity of many engaged in nationally important industries. The treatment of the condition is indeed one which merits the attention of civil defence authorities. It is therefore suggested that, where possible, staff difficulties be obviated by seconding auxiliary and assistant nurses from other civil defence duties to that of combating the scabies scourge. Under such a scheme as the foregoing it should be possible for scabietics to follow their employment, going to work from hospital and returning there until cured. In the meantime the houses vacated should be "fumigated," so that on the families' return after a few days' to a week's treatment there should be no risk of reinfestation.

I heartily agree with Dr. Bigham that the present situation regarding scabies is one requiring urgent and nation-wide attention. My suggestions may be practicable in certain areas; in others such methods will be out of the question and, as in everything else, local conditions will govern whatever measures may be taken. It would be interesting to get the views of others dealing with this problem.—I am, etc.,

N. M. MACDONALD

Department of Health, Rotherham, March 3.

Control of Lice

SIR,—I have read with considerable interest Prof. P. A. Buxton's article on the control of lice in the *Journal* of November 2, 1940 (p. 603).

During the typhus epidemics which have occurred in this town of recent years we have naturally been interested in the destruction of lice on clothing and on people; and in the course of certain very crude experiments we made a somewhat interesting observation which, in spite of the crudeness of the experiment, appeared to be a quite definite fact—namely, that ammonia (that is, ordinary solution of ammonia), if added in varying percentages from 2 to 4, increased the toxicity of cresol products in a most astonishing way, and, furthermore, that crude cresols containing large amounts of quinoline and naphthalene products were very much more effective than the more purified types.

We used these solutions to supplement our inadequate steam disinfection facilities, but it seems to me that the information may be of value to people in a better position to perform accurate experiments than we, as a purely routine establishment, are. Incidentally, we found this crude solution was not without value in diminishing the incidence of bed bugs in camps.—I am, etc.,

J. H. JORDAN.

Public Health Department, Shanghai, Jan. 16.

Air-raid Casualties

SIR,—You are to be congratulated on publishing the very frank account of some recent air-raid casualties by Dr. Margaret Ball and Mr. George Quist (February 22, p. 273), disturbing though it is in several respects.

That replacement of fluid is not sufficient in itself to overcome severe shock is a conclusion which to many will not be unexpected in spite of recent more optimistic reports. Whatever the end-results it would seem to many that there is a nervous factor still undetermined which is, of course, quite unaffected by mere administration of fluid, and, indeed, it would seem that it is probably only those persons with a certain nervous make-up who do show shock in its very worst forms. It would be of value to know if there were patients amongst those treated on this occasion whose injuries were apparently as severe and yet in whom shock was less marked.

The other and more disturbing fact noted by Ball and Quist was the delay in operating on two patients who later developed gas gangrene and in whom quite frankly they believe the delay was a not unimportant factor in the development of this most serious complication. One cannot help thinking that with other emergency hospitals within a stone's throw this might have been avoided. The fact that casualties occur on one or other side of a thoroughfare should be no excuse for using hospitals in one sector only, as would seem to have happened in this instance.—I am, etc.,

March 2. W. L. TEMPLETON.

SIR,—It is a little difficult to supply all the data requested by Dr. W. F. Bensted-Smith (*Journal*, March 8, p. 379). Most of the casualties have been admitted within thirty minutes of the accident, and from within a half-mile radius; the importance of blast is almost impossible to determine. It is very likely that a lot of the tourniquets are applied by unofficial agents such as patients' friends, etc., but quite apart from its incorrect application it is doubtful that it is a good thing to cut off the blood supply to an injured limb, particularly when in most cases a local dressing will suffice to stop bleeding.

The estimate of results of resuscitation is complicated by the lack of uniformity in the standards of definition of shock in its various degrees, and any comparison of cases is thereby rendered difficult.—We are, etc.,

MARGARET BALL.

London, W.C.1, March 10. GEORGE QUIST.

First-aid Parties at Scene of Incident

SIR,—With reference to recent correspondence regarding the duty of first-aid parties at the scene of incident, I think it might be of interest to state that for some months we have been teaching our first-aid parties that rapid clearance (and only absolutely essential first aid) was their primary concern at a scene of incident. We cut out elaborate bandaging and splinting and stressed the importance of getting cases off to hospital as soon as possible. All our ambulances carry hot-water bottles. Tourniquets are seldom applied. Exercises in the dark are part of our training scheme.—I am, etc.,

G. C. F. ROE.

Halifax, March 5. Medical Officer of Health.

Too Much Morphine?

SIR,—Recent communications in the *Journal* give the impression that the administration of morphine has been almost routine in the treatment of serious air-raid casualties. It appears to me that far from being a life-saving measure the giving of morphine makes for death not life. Morphine depresses respiration, so that in "blast" cases it would seem to be particularly undesirable. The depression of the nervous system, moreover, in all probability diminishes retraction of the blood vessels and increases the danger of haemorrhage.

In the treatment of over ninety cases of almost all degrees of severity morphine was administered in only two cases; they were of minor but painful eye injuries. The behaviour of the injured was extraordinarily good. With the exception of one man with a fracture of the scapula, who was very fat and had great difficulty in finding a comfortable position, there was

scarcely a groan or complaint and gratitude and appreciation were freely expressed.

Two lessons were learnt. (1) Haemorrhage was not infrequently concealed by the covering up of wounds with large dressings of cotton-wool. It was found that half an hour's steady pressure by an attendant was often necessary to arrest haemorrhage from even a small wound. (2) The value of really hot applications, especially over the heart in cases of shock and (usually) exposure, was apparent. Relays of turkish towels "cooked" in a gas oven were used.—I am, etc.,

March 6. LENNOX JOHNSTON.

Amputation of the Index Finger

SIR,—Although surgical textbooks well-nigh universally proclaim that in operations on the fingers the absolute minimum of tissue should be removed and as much functional length conserved as is possible, I have often wondered if the short stump left by amputation of the index finger at the proximal interphalangeal joint is not more of an obstruction to the function of the hand than an aid.

Recently I had the good fortune to encounter the ideal authority to settle this question—a bootmaker who, because of injuries sustained in a factory accident several years ago, had his index fingers amputated in different ways: the right index was amputated at the proximal interphalangeal joint, and the left through the neck of the second metacarpal bone. On examination the stump of the proximal phalanx and its coverings are seen on the right hand; it is mobile and warm, and has the amputation scar on the dorsal surface. The skin over the free end is stretched and shiny, but is not tender to the pressure of an examining finger. The left hand has a neat and unobtrusive appearance, the neck of the second metacarpal having been divided obliquely; the scar is a dorsal one and not at all obvious. The grip of the left hand is more powerful than that of the right. This man is quite emphatic that his left hand is now the more useful one, despite the fact that he is right-handed, and he expresses the wish that he could get rid of the offending stump on the right hand. It is neither long enough nor strong enough to use in apposition to the thumb in grasping, and consequently the middle finger performs this function of the normal index finger, while the stump, encroaching as it does on the space between the thumb and the middle finger, is really an obstruction to this action unless it is dorsiflexed out of the way. In this latter position the stump is liable to receive knocks on its free end—an event which is followed by severe pain lasting for several hours. The loss of the index finger of the left hand causes little inconvenience, as the middle finger has assumed the role of the index with full competence. The man does not feel this hand to be any weaker than it was before the accident.

Surely the evidence of this illustrative case weighs heavily against the leaving of a short index stump, and favours oblique division through the neck of the metacarpal bone. The loss of the metacarpal head may weaken the architecture of the hand by the necessary division of the deep transverse ligament of the heads of the metacarpals; yet this is compensated by the improved appearance and the regularity of the important cleft between the thumb and the middle finger.—I am, etc.,

St. Andrews, Feb. 20. H. A. HAXTON.

Cut Tendons: An Appeal

SIR,—Following my initial letter on this subject you have published correspondence from others who have testified that they also have never seen a successful result following digital flexor tendon suture by any known method. No one has come forward to champion the present routine method of suture employed throughout the land. We still teach students that flexor tendons should be sutured with full aseptic technique by an experienced surgeon, whereas it would appear that under all circumstances the finger is ultimately stiff and after weeks of unemployment—in the case of highly skilled men on work of national importance—the finger is finally amputated.

May I ask one pertinent question? Is there a single surgeon in the land—general or orthopaedic—resident medical officer—past or present—who has succeeded in establishing a return of movement (active) in the interphalangeal joints after any method of primary or secondary suture of flexor tendons within their digital sheath. If no such success has been obtained, is it not our duty to advise and carry out primary amputation and so get these injured workpeople back to work in as many weeks as it now takes months? If tendon suture is worth the effort and labour now expended, surely someone will sponsor it.—I am, etc.,

Sheffield, March 6. H. BLACOW YATES.

Vitamin K in Obstructive or Surgical Jaundice

SIR,—In his letter (February 22, p. 292) Dr. R. N. Herson takes exception to the statement in my article (January 25, p. 111) that lack of clotting power in cases of obstructive jaundice can be corrected by the use of vitamin K. I quite agree with him that not all of these cases will respond to vitamin K, and I am sorry if my remarks on the subject claimed too much for the treatment.

Lack of clotting power is due to prothrombin deficiency. Prothrombin is manufactured by the liver from vitamin K supplied to it from the intestine. For the absorption of vitamin K the presence of bile in the intestine is necessary, but this is denied it in cases of obstructive jaundice and it is necessary to supply the vitamin by some other means. If the liver is so hopelessly damaged that it cannot utilize the vitamin, then obviously the treatment is of little avail. The less the response of the liver to the treatment, the greater the hepatic insufficiency; in fact, the response might be taken as a measure of liver function.

The finding of white bile in the common duct, as in the case quoted by Dr. Herson, argues prolonged obstruction and superadded infection. In such cases the liver is so severely damaged that the outlook is poor whatever the treatment or however great the surgical skill. But happily the majority of cases of obstructive jaundice are not of this extreme nature, and the liver will be found to respond. It is advisable, if operation is undertaken, that the treatment with vitamin K should not only be carried out before but continued after operation. Where the response of the liver is not good the treatment must, as in Dr. Herson's case, be supplemented with blood transfusions. By blood transfusions prothrombin is supplied direct, though the increase in prothrombin by this means rarely exceeds 10% to 15%. Fresh blood is preferable because of its platelet content. Plasma, in these cases, is perhaps not as good as blood, certainly not as good as fresh blood. It has been estimated that the prothrombin content of stored plasma falls to 40% in the first week, and to 15% in three weeks.

I was not aware that undue claims had been made for the efficacy of vitamin K in cases of obstructive jaundice. Dr. Herson's letter suggests that such claims are common in the literature. Certainly many surgeons in America have testified to the benefit of the treatment in cases under their care. They have not hesitated, however, to draw attention to the fact that there were cases which did not respond to the treatment, and in these cases post-mortem examination showed that very little normal liver tissue could be found.—I am, etc.,

London, W.1. MICHAEL J. SMYTH.

Prosthetic Ulcer

SIR,—Mr. H. T. Simmons has performed a useful service in giving such a careful description (January 25, p. 119) of a not uncommon benign dental condition which, on account of its resemblance to carcinoma, is liable to lead to unduly extensive treatment and a pessimistic prognosis, as he points out. I have known such a case demonstrated as an epithelioma to a Fellowship course at a teaching hospital. He correctly states that the condition is not described in the surgical textbooks. The dental literature[1] contains several references, which are, however, rather inadequate. Prinz and Greenbaum,[2] and also Wright,[3] give fair descriptions, and the latter includes the histology.

Hyperplasia of the gum due to ill-fitting dentures is, however, well recognized by dental surgeons. Cases are not infrequently shown at clinical meetings, and I have personally

[1] *Oral Surgery*. By S. V. Mead. London, 1940, pp. 644, 1201.
[2] *Diseases of the Mouth and their Treatment*, London, 1935, p. 217.
[3] *Dental Cosmos*, 1934, **78**, 911.

demonstrated two. The alveolar mucoperiosteum readily undergoes hyperplasia as the result of irritation, and I consider polypus of the gum, fibrous epulis, and this condition to be somewhat similar.

The term "prosthetic ulcer" is widely used to denote the small ulcers frequently seen in relation to a denture, whether due to lack of fit, excessive bite, hard foods, or other conditions. In the type described the basic change is a hyperplasia, as Mr. Simmons so well shows. It is usually ulcerated when seen by the surgeon, because it is the pain and fear of malignancy that cause the patient to seek treatment. I think this condition should be differentiated by the use of another name, for when the dentures are discarded there is no ulcer but the hyperplasia remains. "Gingival fibromatosis" and "gingival hyperplasia" can both be confused with other conditions, and "hyperplasia of the gum due to ill-fitting dentures" is probably the most accurate, if lengthy, term.

These patients already have excessive absorption of the alveolus, so that care must be taken in treatment lest cicatricial tissue develop and make the successful fitting of a stable denture still more difficult. I am interested that Mr. Simmons obtained good results by diathermy. Certain cases are suitable for excision and the insertion of buccal inlay. Slow but effective is the well-established method of ensuring that no dentures are worn for twelve to eighteen months, and this is often preferred by the frail and elderly patients subject to the condition. In the less severe cases drastic easing of the denture is sufficient, and I have one such case under treatment at present.

The prominence of Mr. Simmons's opening statement is unfortunate, for the statistics of a radium institute surely give no safe indication of the relative incidence of innocent and malignant tumours. Accurate statistics of this type are most difficult to obtain, but if odontomes are classed as tumours, it is my belief that tumours of the buccal cavity are more frequently benign than malignant.—I am, etc.,

London, S.W.1, Feb. 25. B. W. FICKLING.

Cyclical Mucosal Ulceration

SIR,—It would seem difficult to exclude recurrent herpes as an explanation of at any rate some cases of "cyclical mucosal ulceration" of the type Dr. M. H. Pappworth describes in his article (February 22, p. 271), and particularly of those in which ulcers are associated with menstruation.

When acquired in early life—the primary infection apparently being the common aphthous stomatitis of children—the herpes virus appears to persist more or less indefinitely, lying latent in epithelial cells until activated by some local or general disturbance, such as, for instance, the menstrual function. After the face, where of course it often recurs with extraordinary persistence and at regular intervals, sometimes in the same area each time, the commonest site for recurrent herpes is the genital region. Catamenial herpes is a recognized type, and certain women have an outbreak either around the mouth or on the genitals at nearly every menstrual period. Any portion of the vulva may be affected and occasionally the vagina and cervix uteri. In these situations or in the mouth, where the affection is certainly less common, the herpetic vesicles because of friction and maceration are ephemeral, being quickly transformed into superficial erosions so that the lesions may present a varied appearance.

Although as a rule herpes only affects one area at a time, it has been observed on a number of different sites simultaneously.

From Dr. Pappworth's description, the ulcers in his cases are suggestive either of herpetic erosions or of common aphthae. They were all apparently very small and superficial, were surrounded by an inflammatory halo, and were preceded by and associated with pain. They often appeared to begin as papules or vesicles and most of them lasted only two or three days. All healed without leaving scars. They would not seem to correspond to the lesions either of so-called "periadenitis mucosa necrotica recurrens" (Sutton, sen.), which begins as a painless submucosal nodule later necrotizing in the centre and leaving a crater extending well into the corium with marked induration of surrounding tissues, or to Lipschutz's "ulcus vulvae acutum," even of the milder veneroid type, in which new ulcers appear as old ones heal so that the disease lasts a month or longer. Moreover, relapse has been noted in only a small proportion of cases of this disease—one of Lipschutz's patients, for instance, had seven attacks in nine years.

Regarding Dr. Pappworth's statement that recidivating buccal and genital ulceration seems to be peculiar to women, Dr. Dowling some while back had a man under his care at St. Thomas's Hospital with severe and more or less persistent ulceration of the mouth in whom a number of ulcers of a more superficial though not herpetic type also appeared on the penis and scrotum. Dr. Dowling considered he probably came into Sutton's group. O'Leary (*J. Amer. med. Ass.*, 1932, **98**, 466) saw a case in a male in whom the posterior part of the scrotum and penis was involved in association with ulcers in the mouth. It is interesting to note that in one of Whitwell's cases (*Brit. J. Derm. Syph.*, 1934, **46**, 414), that of a man of 34 in whom mouth ulcers were associated with attacks of iritis, on one occasion four transitory herpetic erosions were observed on or behind the corona of the glans penis. Another of Whitwell's cases referred to by Dr. Pappworth, a woman of 29, had been subject to recurrent labial herpes provoked by colds or sunlight. These outbreaks were then replaced by weekly attacks of mouth ulcers of a deeper, more ulcerative type, with several of which were associated vulval ulcers.

The nature of these lesions, especially of recurrent buccal ulceration, which is a most trying and by no means uncommon affection, is certainly very puzzling, and there is at present much confusion in their nomenclature and classification.—I am, etc.,

Harley Street, March 1. E. W. PROSSER THOMAS.

Combined Trigeminal and Geniculate Zoster

SIR,—I have read with considerable interest the article by Major John D. Spillane on his case of combined trigeminal and geniculate zoster (February 15, p. 236). There is one point, however, on which I am a little uncertain, and on which the textbooks are not very helpful. I was under the impression, possibly mistaken, that a neurotrophic virus progressed along nervous connexions, and could not, so to speak, "jump gaps." If this is so the anatomical pathway suggested by Major Spillane is a little puzzling.

The greater superficial petrosal nerve (Birmingham nomenclature—Major Spillane says "superior," but presumably refers to the same nerve), although it lies in close relation to the ganglion trigeminale, does not actually connect therewith, and in fact does not pass through the cavum trigeminale, which houses the posterior part of the ganglion. The only possible true anatomical connexion seems to be via the internal carotid plexus, which gives branches to the ganglion trigeminale and to the deep petrosal nerve. This latter does connect with the greater superficial petrosal to form the nervus pterygoideus. These branches, however, are minute in the extreme. The external petrosal nerve is, by all accounts, so inconstant and so small that it seems risky to postulate it as a track for the virus, especially as again the connexion is only through plexuses on the internal carotid and middle meningeal arteries.

Of course, if the virus is not strictly limited to purely nervous pathways, then the question does not arise, but I should be interested to know if this is so. Major Spillane's article implies this in suggesting a route via the greater superficial petrosal nerve.—I am, etc.,

March 3. ROBERT G. W. OLLERENSHAW.

Damp Beds and Angiospasm

SIR,—In your issue of February 22 (p. 296) Sir Leonard Hill mentions the heat given out when dry clothing is moistened—as by the patient's skin. May I comment on the reverse of the picture and thus remedy an omission in my paper on "Blunders of Plain Muscle" (*Lancet*, September 27, 1937).

A good deal of body heat is needed to convert into vapour the water contained in cold underwear or bedclothes, especially

if they are damp. People with an enthusiastic circulation can usually supply this body heat. But there are certain people of the anxious, striving temperament who are liable to spasm in any of their tubes or sacs lined with plain muscle. This leads to asthma or migraine, spasm of the pylorus or colon, goose skin, cold extremities, and the like. When persons of this type undress in a cold room or get into a cold bed the arterioles of their extremities go into spasm. Unless aided by a hot bottle or hot bath their extremities remain cold and they cannot sleep till warmed. If the bedclothes are damp, their cold skins are unable to supply the considerable heat needed to vaporize the water in the damp sheets. Their fussiness about well-aired bedding, though well founded, makes them the laughing-stock of people with normal circulations.

I read that in Tibet a holy man will have his holiness assessed by sitting beside a hole in the ice while his friends drape his naked body with a sheet wrung out of the ice-cold water. His holiness is measured by the number of sheets he can dry successively by his body heat. I fancy five was the record! The test will at any rate eliminate any circulatory anxiety neurosis, and perhaps this may be one index of a mind completely satisfied by religion. For it is asserted by T. A. Ross in his book on psychotherapy that the truly religious never become neurasthenic. But in this country I fear our habits of comfort (and religion?) render most of us incapable of airing our own beds; certainly those liable to angiospasm cannot do so.—I am, etc.,

Hull, Feb. 25. FRANK C. EVE, M.D., F.R.C.P.

Experimental Human Scurvy

SIR,—The paper by Dr. F. W. Fox on experimental human scurvy (March 1, p. 311) raises some important points. We are asked to believe that the classical picture of scurvy is considerably overdrawn. In a quotation from Hess the implication is given that Lind stated that the indolent and slothful sailor was the first to suffer from scurvy. What Lind says (*Treatise on the Scurvy*, third edition, 1772; Postscript, Sect. IV: Observations on the Causes Productive of the Scurvy) is: "Lastly, troops that have undergone much fatigue, as also sailors who have worked very hard, may become afflicted with this disease; whence it may be also inferred, that confinement, sloth and indolence, though frequently, are yet improperly assigned, as causes of the scurvy." From Dr. Fox's article it would appear that the really active do not develop scurvy. Might it well not be that the indolent and slothful are so because of their lack of ascorbic acid?

With regard to the relation of gingivitis to scurvy the following quotations from Lind (*Scurvy in Hampshire*, p. 271) are of some interest:

"In Haslar Hospital the appearances of the disease were various. . . . The gums were not always affected. . . . Several complained of extreme weakness and a pain in the back." "The gums of several bled, being sore and spungy, without their having any other symptom of the scurvy. One person was greatly alarmed with a spitting of blood for three days, which I found to be no more than the scurvy affecting his gums."

—I am, etc.,

ROBERT COOK,
Lecturer in Biochemistry, University College, Dundee, University of St. Andrews.

Dundee, March 4.

Malignant Measles?

SIR,—Dr. Audrey Z. Baker writes (March 8, p. 380) that a case which she describes "may be worth putting on record" as one of "black" or malignant measles. Comment has already appeared in the daily press, but I doubt if it should be recorded in medical history as an additional case.

The description given by Dr. Baker is an excellent presentation of the symptoms, signs, and course of acute suprarenal insufficiency, usually known as the Waltherhouse-Friedrichshen syndrome. While the aetiology of the condition is obscure it is relevant to inquire if there have been any cases of meningococcal meningitis in the district.—I am, etc.,

W. H. PATTERSON.

Booth Hall Hospital, Manchester, March 8.

Nurse Anaesthetists

SIR,—In his letter of March 1 (p. 339) Dr. W. Stanley Sykes accuses the University of Cambridge of taking a "retrograde step" and instituting "that bane of the second-rate American medical school—the nurse anaesthetist." This "retrograde step" has been taken by Addenbrooke's Hospital, which, apart from an arrangement with regard to elementary teaching and the provision of facilities for examinations, has no connexion with the University, the Governors directing and controlling the whole administrative work of the hospital. In fact, the honorary staff, though represented on the Faculty Board of Medicine of the University, did not bring this action to the notice of the University.

It is difficult to imagine anything more unworthy of a graduate of this university than Dr. Sykes's action in making this accusation, accompanied by a threat, without attempting to ascertain the facts from the Secretary of the Faculty Board or any other person competent to give him accurate information, or even consulting the Ordinances.—I am, etc.,

RAYMOND WILLIAMSON,
Secretary of the Faculty Board of Medicine, University of Cambridge.

March 10.

SIR,—The following extract from a judgment given in the Superior Court of the Province of Quebec,' and quoted by H. R. Griffith (*New York State Journal of Medicine*, 1940, **40**, 213), is pertinent to this discussion:

"The following propositions are established: (*a*) that the administration of a general anaesthetic is a dangerous thing even to the point of possibly causing the death of the person submitting to it; (*b*) that during the anaesthetic surprises, complications, sudden and unforeseen situations, dangerous to the patient and capable of causing his death, may arise; (*c*) that with the presence of a physician specializing in anaesthesia the life of the patient might almost always be saved when a complication arises during the anaesthetic. . . . The administration of a general anaesthetic is at the same time a science and an art; easy, this science and this art, when all goes well, . . . difficult and exacting of skill and experience when a sudden and dangerous complication arises (these complications vary with the patient and never present exactly the same aspect), being able to cause death very rapidly, if a competent anaesthetist, experienced and knowing how to act quickly in this particular complication, is not ready to cope with it with the discretion, the precision, and ability which can come only with the union of medical science with experience. . . . An anaesthetic agent is a drug which shows its action by certain signs; by these symptoms and signs one knows what is happening to the patient; and to understand these signs and to judge what may arise it is necessary to know medicine. . . . A nurse has not the required medical preparation to be able to cope with an accident during anaesthesia. . . . The surgeon cannot and should not supervise the anaesthesia . . . all his attention and all his faculties should be concentrated on the operation itself without the preoccupation of accessory or extraneous things . . . when a critical situation does arise the surgeon, who should then suspend the operation, comes to assist the anaesthetist, but it is still the latter who remains always the person in charge of the security of the patient."

—I am, etc.,

Goodmayes, Essex, March 2. R. BLAIR GOULD.

Medical Planning Commission

SIR,—I am very glad to see the steady flow of comment and criticism which the Commission has evoked. There is, of course, room for diversity of opinion about its reference and its composition. I myself would much have liked to see more representatives of women and of youth on it, but the problem of selecting the latter is a very difficult one. Young doctors, unless they are predestined medical politicians, are usually too busy making their careers to take much interest in medical affairs, and at present most of them are engaged on something even more important and more urgent. But exception may rightly, I think, be taken to the argument that such a Commission ought to have been set up by some other body, preferably the Government. This point of view has been voiced by Sir Ernest Graham-Little and by Mr. Aleck Bourne.

Of course the former would naturally try to crab anything the Association did: I have always expected carping and ungrateful criticism from him and have never been disappointed.

Mr. Aleck Bourne is in a different category, and I should like to know just what he means by his statement that the chief reason for misgiving about the Commission is that it was "conceived and appointed by a private body which is by no means representative of the whole profession." A *private* body seems to me a somewhat unfortunate term to apply to one which is open to every registered practitioner; which contains a majority of all the practitioners in the country and of every kind of practitioner; and which frames its policy by a constitution which has been declared by good and independent authorities to be a democratic model. As for its representative capacity: what is Mr. Bourne's criterion for this? I suppose he does not insist that for a body to be representative it must include every potential individual. If he does then there is no representative organization of any calling in this country. The trade unions, for example, always consulted by the Government, have a smaller proportion of potential members than we have.

In my more active days the standard complaint was that the B.M.A. did nothing, or was always too late. Now it seems to be suggested that we should leave initiative to the Government. My view is quite contrary. If it be not the duty and the privilege of a body like ours to formulate its views as to the best way of using the profession for the good of the community, I think we had better disband it. The fact of the matter is that many of our members have not a proper pride in their Association, and do not realize what a great national institution it is. In the last war it rendered a service which was unique and which no other body, Government or otherwise, could have rendered, when it successfully undertook to provide all the doctors needed by the Services with due regard for civilian needs. This was handsomely recognized by the Government, not only at the time, but in the present emergency when it gladly accepted the Association as its agent in a similar capacity.

The Commission has undertaken a most honourable and onerous duty, and I hope we shall encourage it in every way we can. When it has finished its labours it will be for the Government to decide how far its report can be used as a basis for action. At any rate we shall have done our best, and I prophesy that we shall be as proud of having done this duty to the best of our ability as we rightly are of our share in the conduct of the medical side of this war and the last.—I am, etc.,

Henley-on-Thames, March 2. ALFRED COX.

SIR,—I have great respect for Dr. Pooler's opinion, but he has misunderstood me. Writing of the Commission I used the phrase "judge and jury" in the colloquial sense, meaning a composite body, in this case not conducting a trial, but making an inquiry, calling witnesses, taking their evidence, weighing it, and issuing a report as to what will be the best and most suitable form of medical service for the State.

This report to be effective must be authoritative and well balanced, and those on whose behalf the inquiry is being made—that is, the people—will look on it as being prejudiced if any one section of the medical services of the country was predominant in the Commission. It must propound a service that will be of intimate import to every member of the community: a service to keep them in health, to cure them if ill. General practitioners have a great responsibility in preparing their evidence and ample opportunity to present it.

If the report is, before publication, circulated to the Divisions for their consideration the great majority of those discussing it would be general practitioners and they would have an opportunity seldom granted to witnesses in such a case.—I am, etc.,

Westbury, Wilts, March 9. CHARLES E. S. FLEMMING.

SIR,—The letter of Lieut.-Colonel C. J. Stocker in your issue of February 22 (p. 296) merits the careful consideration of every member of the medical profession and more especially of the members of the B.M.A.

To me, as to him and to many other doctors, the proposal of the B.M.A. to set up a Commission to settle our future has come as a shock; and the composition of the Commission gave me a still greater shock, composed for the most part, as it is, of what Colonel Stocker aptly calls "the usual medical oligarchs," with an entirely inadequate representation of the general practitioner and practically no representation of the rural general practitioner.

As a member of the B.M.A. of over forty years' standing, a member of the representative body for several years, and a member of Council, I have some right to speak for the general practitioner in Northern Ireland, and I believe that the present policy of the Association, if persisted in, will disrupt the profession and the Association. From my own knowledge I can confirm Colonel Stocker's statement that "there is a growing opposition to B.M.A. methods both within the fold and outside it." Whilst I hold my own very definite opinion as to necessary reforms in the methods and constitution of the Association if it is adequately to represent the views and protect the interests of the largely inarticulate majority of the profession, I fully agree with him that "it is high time that an 'official' opposition should be organized."

The Medical Planning Commission, formed as it was in a hole-and-corner manner, has not the confidence of the bulk of the profession who had no say in the choice of its personnel, and it should be dropped if worse is not to befall.—I am, etc.,

Belfast, Feb. 25. W. LYLE.

Value of Raw Greenstuff

SIR,—Writing on the second day of March, I am reminded of the passing of February, "the month of fevers," with all its menace. It is the month of fevers because it is so long since the spring flush of grass in the previous year gave health and vigour to the animals, and to mankind that consumed their products. By February the protective store is well-nigh exhausted.

At this time when the supplies of food are altered and in some ways lessened there is need to give attention to the use, now in this springtime of all others, of fresh green leaves which a man may himself use—to wit, such as dandelion leaves, watercress, mustard and cress, chives, chervil, chicory, fennel, celery, celeriac. Eggs from hens upon grass are in short supply. Milk for adults may be less plentiful as pasture lands are ploughed. Fresh liver and kidney and many other indirect sources of the protective qualities of food are hard to come by—the more therefore the need to take them direct from their source. The animals do: "These wait all upon Thee that Thou mayest give them their meat in due season." Now is the due season, and, to put it simply, a far wider use of raw greenstuff—say, a leaf or two eaten with each piece of bread and butter—will make next February less a month of fevers than usual, despite Herr Hitler and all his works.

Oranges are in short supply and often have lost much vitamin C in storage. A swede or turnip, in which a hollow the size of an egg is made and filled with honey or brown sugar, will yield a juice not only full of "C" but very acceptable to little children.—I am, etc.,

Holmes Chapel, March 2. LIONEL JAS. PICTON.

Calcium Requirements and Fortified Bread

SIR,—With reference to the Government's decision to fortify bread with calcium it is stated in your leader of February 22 (p. 281) that "the amount and the nature of the calcium salt to be added to bread are still not settled." In your leader of July 27, 1940, it was suggested, however, that the proposed addition would, on the average consumption of bread, amount to 200 mg. of calcium daily. If amounts of this order are under consideration, and it is accepted that calcium as carbonate is utilizable, the intake of calcium from water supplies appears worthy of notice.

In normal times, when a generous dietary including dairy products and vegetables afforded an ample supply of calcium in suitable combinations, it seemed that drinking-water was an unimportant source of calcium. In the light of the opinions expressed in recent articles on calcium requirements this view may, however, now merit reconsideration. The calcium content of water supplies varies widely. It is practically *nil* in areas where the water is derived from upland sources (mostly

in Scotland, Wales, and the North of England), but in other areas (mostly in England) it exceeds 400 mg., and may even be 800 mg., per gallon. Thus Loch Katrine water contains no more than 7 mg. of calcium per gallon, and the average of upland waters is of the order of 40 mg. per gallon. On the other hand, the average calcium content of hard waters derived from the chalk is approximately 450 mg. per gallon, and the greater part of the calcium is present as bicarbonate. Assuming the average daily consumption of water in one way or another is three-quarters of a gallon, over 300 mg. of calcium will thus be regularly supplied in most hard-water areas. This is not an insignificant proportion of the estimated daily requirement, and it exceeds the amount (200 mg.) mentioned above as the proposed addition to bread. In such hard-water areas softening—that is, partial removal of calcium—is practised at a few waterworks, sometimes under statutory obligation, and many households are equipped with domestic water softeners.

In view of these various considerations it is suggested that calcium addition to bread might be unnecessary or less important in hard-water areas than in those supplied from upland sources. Also, the advisability, from the dietetic standpoint, of removing calcium from drinking-water by softening processes may be questionable at the present time.—I am, etc.,

London, March 4. E. V. SUCKLING.

Calcium Requirement

SIR,—There are some points in the discussions on calcium requirements in the *Journal* of February 22 which merit close consideration. In dealing with the first of these I employ figures quoted by Prof. Cathcart in his Oliver-Sharpey Lectures (*Lancet*, March, 1940, pp. 533 and 586), in which, it may be said in passing, will be found also pertinent criticism of calcium standard formulation, including the remark that "our knowledge of calcium needs is strikingly elementary." Sherman laid down a standard requirement for calcium on the basis of ninety-seven experiments collected from the literature, and found the mean value of the average intake to be 0.45 gramme. In these ninety-seven experiments the level at which equilibrium was obtained varied in individual subjects from 0.27 gramme to 0.82 gramme a day. Leitch, from her statistical study of calcium balance experiments in the literature, concluded that the daily calcium requirement for an adult is reached with an intake of 0.55 gramme; but that positive balances occurred with an intake as low as 0.15 gramme and negative balances with intakes as high as 0.7 gramme.

I do not enter upon a discussion of the significance of the fewness of the cases employed as the basis of computation of these standards and of the lack of evidence that such cases are a true sample of the adult population or of the warrantability of the addition of as much as 50% to the standard as a "safety factor." I confine myself to a consideration of the possible meaning of the groups of extreme cases at either end of the frequency curve. Is it not a reasonable interpretation of their existence to suggest that they are significant of something very abnormal either in the observational methods employed or in the physiology and metabolism of the subjects observed? It seems, indeed, probable that while a close and detailed study of these might reveal new and unexpected factors influencing metabolism, their inclusion in an "average" or "mean" must detract from any value such a conception may be supposed to possess in the present circumstances. Would it not be more logical in such cases to employ the "mode"—that is, the most frequently obtained result in the series—as the standard of calcium requirement, on the analogy of majority rule in political and other spheres?

As regards a second point, if the standards of calcium requirement proposed are inaccurate, as undoubtedly they are, the figures based on them, alleging to show the amount of calcium deficiency in the community, must be even more fallacious. Again, the amount of calcium and other dietary constituents present in vegetable foodstuffs (as Prof. Cathcart points out) varies with the season, type of fertilizer used, type of soil, parts utilized, locality where grown, variety of plant, and the like within quite wide limits. What guarantee is there therefore that, in dietary surveys, the amount of calcium allocated to an individual diet from a table of analysis from a relatively small series of food materials collected most often from a limited area corresponds with the true state of affairs?

Finally, much, indeed it would seem all, importance is attached to the quantity of calcium in a diet. But calcium, as the sulphate or silicate, though appearing quantitatively as such in a chemical analysis, would not be the metabolic equivalent of the same amount of calcium in the form in which it occurs in homologous milk. These are extreme instances, but calcium, as a supplement, is often supplied as compounds of an intermediate character, and especially as the carbonate. In this context it may be recalled that the routine method of producing rickets in experimental animals is by means of a diet rich in calcium carbonate, a procedure which inactivates the phosphate of the diet. The addition of calcium carbonate, in less but still considerable quantity, produces, paradoxically, a deficiency of available calcium and thus brings about osteoporosis. Calcium salts of the strong acids, such as the chloride, produce acidosis and osteoporosis. The effect of quality, therefore, of calcium in a diet, and especially in dietary supplements, by its influence on availability, actually exceeds in its importance on metabolism that exerted by quantity.—I am, etc.,

Aberdeen, March 1. J. P. MCGOWAN.

SIR,—Much correspondence has recently appeared in these columns as the result of a recent paper in which my name appeared as a part author, and I should like to make use of a little space which might help to clarify the position.

It will be understood that I can only write of the experiments in which I participated some four years ago on patients who were admitted to hospital and kept in bed during the period of the experiment. In part due to this, constipation did occur, and is thus a contributory cause of the shift of Ca from excretion in the faeces to urine—a very unusual feature. This shift might also be aided by the difficulty of varying the dietary Ca and at the same time keeping protein, fat, carbohydrate, and other factors constant. I achieved this by use of calcium saccharate, which was thought to be of high Ca availability—a fact borne out by the results, the saccharic acid radical probably being metabolized.

The main aim of the work, as I understood it at the time, was to ascertain the effect of Ca and other variables upon hypertension rather than optimal Ca requirement for healthy people.

From the results published it would appear that Sherman's minimal requirement of 0.45 gramme a day is confirmed, and since the patients were recumbent they would thus have a basal metabolic rate of 0.6 to 0.8 of that of an ambulant person; thus the Ca needs of the latter would be about 0.5 to 0.75 gramme a day, taking metabolic rate into account. Due to the immobilization of Ca by phytic acid, the actual intake would probably need to be more than this, being still higher in pregnancy and lactation.

It is possible that the same conditions may apply to the results obtained since I left Liverpool in 1938; I cannot say, but I do know that at that time the hospital was not equipped for animal work, although it was a future development.—I am, etc.,

G. V. JAMES, M.Sc., Ph.D.,
Welwyn Garden City, March 6. Major, R.A.M.C.

Royal College of Surgeons Council Elections

SIR,—I have recently received a communication from the Secretary of the Royal College of Surgeons of England in which personal canvassing by candidates for a place on the Council is strongly deprecated. Surely the Fellows of the College have sufficient intelligence and judgment to decide on their own response to a personal canvass without any such official pronouncement. Individual voters have in the past expressed in the columns of the medical press their distaste for the personal canvass. The public proclamation of these hypersensitive protestants savours of exhibitionism, or at least a desire that the world shall know the exquisite quality of their virtue. Besides, there is always the waste-paper basket.

Should the Olympic frown of the Council prove effective in suppressing the personal appeal of frank canvassing (an appeal which is a feature of all political appointments, and regarded as embodying the essential principles of democracy),

what measures are contemplated to deal drastically with privileged bodies like the teaching hospitals, especially those what cater for Fellowship candidates by special courses? Not to be overlooked is that powerful caucus, the Surgical Club, who exercise their collective power to influence electors as effectively as do other "clubs"—Buffaloes, Rechabites, *et hoc genus omne*. At the first warning of an impending election these organizations go into secret session and agree on a mass attack in favour of their chosen one. Against the momentum of these exclusive bodies, what weapon shall the candidate use whose origin is lost in the obscurity of some small or even large non-teaching hospital? His reputation may be international, his pioneer work universally appreciated; to him there remains only the personal canvass of the more liberal-minded Fellows, who also have a right to representation on the Council.

Let all canvassing be abolished, or leave the field open in harmony with the basic principles of democracy.—I am, etc.,

London, W.1, March 6. H. H. GREENWOOD, F.R.C.S.

The Services

Colonel (Temporary Brigadier) J. A. Manifold, D.S.O., late R.A.M.C., has been appointed a Deputy Director of Medical Services and has been granted the acting rank of Major-General.

Universities and Colleges

UNIVERSITY OF OXFORD

The Dr. John Radcliffe Prizes have been awarded to J. M. Walker, G. A. Neligan, and M. Weatherall.

UNIVERSITY OF CAMBRIDGE

The Raymond Horton-Smith Prize for 1939–40 for the best M.D. thesis during the academical year has been awarded to O. A. Trowell, M.A., M.D., St. John's College; *proxime accessit*, G. I. Watson, M.A., M.D., Corpus Christi College.

The following have been examined and approved for the degree of M.Chir.: G. Blackburn, R. C. F. Catterall, J. S. Ellis, C. G. Rob.

UNIVERSITY OF LONDON

J. H. Gray, M.D., B.S.Adelaide, has been appointed from May 1, 1941, to the University Chair of Anatomy tenable at St. Mary's Hospital Medical School. Since 1937 he has been senior demonstrator in anatomy at University College.

The title of Professor of Dental Surgery has been conferred on E. C. Sprawson, *M.C.*, D.Sc., M.R.C.S., L.D.S. R.C.S., in respect of his post held at the London Hospital Medical College.

A Board of Studies in Pathology has been instituted within the purview of the Faculty of Medicine.

The degree of D.Sc. has been conferred on P. A. I. Gorer, an internal student, of Guy's Hospital Medical School; D. W. W. Henderson, an internal student, of the Lister Institute of Preventive Medicine; and R. W. Haines, an internal student, of St. Thomas's Hospital Medical School.

The following awards have been made: Chester Beatty Scholarship, T. A. Watson, M.B., Ch.B.; William Julius Mickle Fellowship, C. K. Hallpike, M.B., B.S., M.R.C.P., F.R.C.S.

WESTMINSTER HOSPITAL MEDICAL SCHOOL

On May 8 and 9 there will be held an entrance scholarship examination upon the result of which there are offered for award four scholarships each to the value of £75. The examination consists of papers in chemistry and physics, and English essay; the closing date is April 23. Further particulars can be obtained from the Secretary, Westminster Hospital Medical School, 17, Horseferry Road, S.W.1.

Obituary

THE LATE PROF. WILLIAM BULLOCH

W. E. H. writes from Horncastle: Prof. Turnbull in his excellent tribute to the late Prof. William Bulloch shows convincingly Bulloch's profound knowledge of bacteriology and pathology. May I, who, like Bulloch, sat under that inspiring teacher of pathology—D. J. Hamilton, Regius Professor of Pathology in the University of Aberdeen—add a personal note? As Prof. Turnbull so justly writes: "Bulloch had a great sense of humour, was an inimitable raconteur, and inherently sociable." At the B.M.A. Annual Meeting at Oxford in 1904 the Pathology Section under Ainley Walker was a very strong attraction, for the main theme was immunity, and eminent authorities, such as Wright and Noguchi, were taking part. In the evenings Bulloch was the attraction as his friends gathered round him to hear his brilliant talk, so pithy and to the point. At the opening session on immunity Wright led off with: "It is an infirmity of the human mind that it demands an explanation before it has assorted the facts." He next proceeded to write on the blackboard the then mystic word "opsonin." He was followed by Bulloch, whose opening sentence was also an arresting one. "The task allotted to me," he said, "is to state what is fact and what is fancy in our researches into immunity. We have reached the stage when we marshal our facts and court-martial our fictions." The whole discussion was on a high plane, and Bulloch that day shone among the Olympians.

News has been received of the death of Dr. HANS WILDBOLZ, professor of urological diagnosis at the Berne medical faculty, and chief of the Insel Hospital at Berne, aged 68. He had been an honorary member of the Section of Urology of the Royal Society of Medicine since 1928. His name has been given to a reaction in tuberculosis following intracutaneous injection of the patient's urine or blood.

At the memorial service for Sir Frederick Banting in St. Martin-in-the-Fields on March 5 the Council of the British Medical Association was represented by Mr. W. McAdam Eccles, consulting surgeon to St. Bartholomew's Hospital.

Medical Notes in Parliament

Rockefeller Clinical Studentships in America

Prof. A. V. HILL asked on March 6 whether the Minister of Health knew that an offer had been received from the Rockefeller Foundation in New York to undertake and provide for the clinical training and maintenance of selected British medical students in a number of medical schools in the United States of America and Canada. He asked if Mr. Brown would arrange for all facilities and encouragement to be given for carrying out the scheme. Mr. ERNEST BROWN said he was aware of the offer and desired to express his very sincere appreciation of this sign of practical help and sympathy on the part of the Foundation and of the medical schools in America. He would certainly do all he could to further this scheme. A committee had been set up in this country under the chairmanship of the vice-chancellor of Manchester University to select the students. The first group would leave for America as soon as possible. The General Medical Council, the licensing bodies, and the universities were all in agreement on the advantages of the scheme. He was sure that when the students returned to this country their experience would be of great value, and he hoped that this plan might further strengthen the close co-operation in medicine and public health between Great Britain, the United States, and Canada.

Sir FRANCIS FREMANTLE asked whether Mr. Brown recognized that some of the best students would be reluctant to

leave this country and go to a safer country during the war. In Sir Francis's opinion it was necessary that they should avail themselves of this opportunity. He asked Mr. Brown to encourage them to avail themselves of it as a patriotic duty. Mr. BROWN said the Government understood that these young men would have such feelings. They could be assured that by going and continuing their training in America they would undertake the best form of national service.

Family Allowances

The BISHOP OF WINCHESTER, in the House of Lords on March 5, moved a motion advocating family allowances to prevent the increased cost of living from injuring families with dependent children. He recalled that he raised this subject in 1938, when the Government found itself unable to appoint a committee on it. He now said that children had to bear the heaviest burden of poverty, which was largely confined to families in which there were three or more children and in which the wage-earner was poorly paid. This had been accentuated lately by war conditions. If these children were neglected they would grow up anaemic, unhealthy citizens. If a man was in work he had no family allowance, but if he was out of work the Public Assistance Board made an allowance for the children he had.

Viscount SAMUEL said the case presented was overwhelming. An immense number of the children of the country had too little food or food of bad quality. Their health and strength were impaired. In this country 1,250,000 children belonged to families where there were four, five, or six children. Nemesis was now upon the country because, owing to the strain on families combined with the invention of means of birth control, there had been a catastrophic fall in the birth rate. The House would remember a cogent speech made on that subject by Lord Dawson of Penn during a debate in June, 1939. The Metropolitan Police and some of the most enlightened industrial firms had introduced family allowances, in each case with complete success. Lord STAMP suggested that wage increases based on the cost of living should be measured by reference to an average family of two children and recognition of the needs of additional children.

Lord MOYNE said that a year or two ago the report of the Unemployment Insurance Statutory Committee showed that when weekly payment was based on a subsistence level, the wage level earned for large families had been dangerously depressed below the absolute necessities of life. Family allowances were only one method of dealing with this intricate problem. It would be out of the question to ask the Chancellor of the Exchequer to assume the burden of family allowances at the present time. There was much to be said for the view that Parliament should begin by methods of direct assistance such as the provision of pure milk, which could not fail to go to the benefit of the children. One-fifth of the milk drunk in this country was now going through the channel of the milk scheme. He found no hostility shown by the Chancellor of the Exchequer to the idea of family allowances as part of post-war reconstruction if an acceptable scheme could be worked out. But the Chancellor made it clear that he could not afford the present system of subsidizing the necessities of life and at the same time provide for family allowances. Mr. Greenwood, who was charged with planning the post-war system, was giving consideration to the question.

Diphtheria Immunization in Scotland

On March 4 Mr. LEACH inquired why the subcommittee which recently reported on the practical application of diphtheria immunization in Scotland, and ascertained the number of children immunized in Edinburgh and other particulars concerning diphtheria immunization in that city, did not also obtain details, known to be available in the medical officer's office, of the number of cases of diphtheria and deaths from that disease in immunized and non-immunized children. Mr. JOHNSTON replied that in Edinburgh much of the diphtheria immunization had been done by general practitioners. Accurate information whether individual children were or were not immunized was not available either to the Public Health Department or to hospitals where cases of diphtheria were treated. Such particulars as were available were approximate only, and were, therefore, not regarded by the Scientific Advisory Committee as appropriate for inclusion in their report.

Advancing the Clock

Mr. HERBERT MORRISON said on March 4 that the addition during the summer months of an extra hour's daylight in the evening would be advantageous to the war effort in many ways. In many factories it would enable two shifts to be worked in daylight. The conclusion of the Government was that, provided the period during which the changed time operated was limited to mitigate the agricultural disadvantages, the scheme ought to be adopted. He accordingly proposed to make a Defence Regulation advancing the clock by another hour from the night of Saturday, May 3, to the night of Saturday, August 9. The House of Commons would have an opportunity to debate this Regulation.

Distribution of Medical Man-power

Mr. BROWN told Mr. Mander on March 6 that recommendations would shortly be published from the committee presided over by Sir Arthur Robinson to consider the steps necessary to secure a proper allocation of the available medical man-power between civilian and medical services. Mr. Brown added that in conjunction with the other Ministers concerned he was taking action on the recommendations. The committee sat for seven days and heard seventeen witnesses, of whom twelve were medical. As the inquiry was urgent and confidential the committee only called for such evidence from Government Departments and public bodies as it required to supplement the considerable knowledge of the subject possessed by its members. He would be glad to seek further competent advice if the recommendations proved that to be necessary. The committee's deliberations were confidential.

Sir LEONARD LYLE inquired on March 5 if Mr. Brown was aware of the shortage of doctors in many rural districts, especially when these were overcrowded with evacuees of all sorts. He asked what steps were taken to ensure that the younger doctors were not called up before the real need began for the use of their services by the Army. Miss HORSBRUGH replied that Mr. Brown was aware of the shortage of doctors in some rural areas and appreciated the difficulties. The measures which he was taking in conjunction with the Service Ministers and the Secretary of State for Scotland on the recommendation of Sir Arthur Robinson's committee were designed to reduce to a minimum the number of doctors to be called up from private practice. In selecting the individual doctors for commission the Central Medical War Committee and its local committees gave full weight to the special needs of the reception areas. A definite scheme was to be arranged to ration doctors both for the civilian population and the Army. The matter was being gone into and the doctors who might have been called up were remaining in their civilian practices. Answering Sir Francis Fremantle, Miss Horsbrugh said she could not give the date when the priority committee would get to work.

Casualty Services: Cardiff's Example

Dr. MORGAN asked on March 6 whether the attention of Mr. Brown had been called to the arrangements in Cardiff, in which every general practitioner had been provided with adequate equipment for dealing with air-raid casualties at the site of incidents, and had been informed exactly how the air-raid precautions services were organized and the part which he would have to play in them. He asked Mr. Brown to compel the making of similar arrangements in other towns. Mr. BROWN said he had received a report on the arrangements at Cardiff. While he approved them generally he was asking his medical officers to communicate with the responsible local officers on certain aspects of the scheme which required further consideration. His medical officers were constantly in touch with medical officers of health on the most suitable arrangements for utilizing the services of practitioners in the area. These must necessarily vary in detail according to local conditions.

Dr. MORGAN suggested that in many large towns a number of general practitioners had been given no opportunity to

acquaint themselves with the various phases of air-raid precautions work, or with the persons, the aid posts, etc., with which they would be required to co-operate in case of emergency. Mr. BROWN said medical officers of health were asked last year to make plans for reinforcing the hospitals and first-aid posts, in case of emergency, by practitioners not officially attached to those services. They had generally got into touch with the profession in their areas, by calling meetings or otherwise, in order to familiarize them with the services.

Trichiniasis

Dr. MORGAN referred on March 6 to the recent occurrence of cases of trichiniasis in parts of Great Britain and the identification of pork and pork products as their cause. He urged the compulsory heating and cooking of all such products, especially those used in the making of sausages. Mr. BROWN replied that investigations were in progress with regard to these occurrences. By wireless and in the Press it had been pointed out that provided pig meat was thoroughly cooked no risk would be run. He did not think it necessary to order the compulsory heating and cooking of all pig products.

London's Ambulance Service

On March 6 Mr. BARTLETT inquired how many ambulance stations in the London area were fully staffed on the scale laid down at the beginning of the war; and how many resignations and enlistments took place in the last six months. Mr. BROWN said in reply that the establishment of the London auxiliary ambulance service was not laid down in terms of stations, the staff of which could vary according to circumstances. The total staff of the service was somewhat below the authorized strength, but had proved adequate to meet the calls made on it. In the six months September, 1940, to February, 1941, resignations numbered 1,268 whole-time and 357 part-time staff, while enlistments numbered 608 and 275 respectively. Mr. Brown paid tribute to the courage and devotion shown by the ambulance staffs in maintaining this service.

Physiological Problems of Flying

Introducing the Air Estimates on March 11, Sir ARCHIBALD SINCLAIR said special attention was being paid to the problem of cold, to the supply of oxygen at high altitudes, and to night vision. The development of aircraft tended toward flying at great heights, and research was continuous to find a solution to the physiological problems involved. The problem of cold was being tackled by the sealing up—a difficult technical problem in a fighting aircraft—and the heating of cabins, and by provision of equipment, boots, gloves, helmets, and underclothing of special design. The psychological care of pilots was not less important. The early detection of signs of flying strain formed an important part of the duties of medical officers of the Air Force. The fighting spirit of the pilots was so strong that unless they were closely watched they kept on flying long after they should have been rested from operations. The doctor's duty was to catch them in time so that the squadron or station commander could make them rest. Good results had been achieved. The incidence of flying strain had been considerably lower than was expected before the war. The Ministry's four orthopaedic centres were second to none in the country to-day. Behind them were rehabilitation centres situated in the healthiest parts of the country, at which the most up-to-date methods were applied to secure recovery as quickly as possible. In addition, centres with the most modern forms of treatment for severe burns had been established.

Doctors' Duties in Invasion

Mr. GROVES inquired on March 11 whether any comprehensive scheme had been formulated and notified to all civilian members of the medical profession whereby their services were available and their precise duties known in case of emergency, whether due to air raids or invasion. Mr. BROWN answered that it was obviously impossible to assign precise duties in advance to every civilian doctor. The plans for reinforcing the hospital and first-aid post services in the event of military operations in this country were, as announced in the medical press last month, being worked out in conjunction with the appropriate R.A.M.C. officers and also, in order to secure consultation with practical medical bodies, with the secretaries of Local Medical War Committees. He had every reason to believe that this procedure would produce satisfactory and efficient schemes.

Shelter Conditions in Provinces.—Miss HORSBRUGH stated on March 11 that the attention of Mr. Ernest Brown had been called to Lord Horder's report on March 4 about children living in public shelters in the Provinces. Mr. Brown had recently inspected some of the shelters Lord Horder had in mind, and had under active consideration proposals for dealing with the matter.

Notes in Brief

Of the 42,319 claims for injury allowances up to February 1, 1941, from civil defence volunteers and other civilians, 3,438 were rejected, and of the 5,483 claims for pension 615 were rejected.

Medical News

The next meeting of the Association of Industrial Medical Officers will be held on Saturday, March 22, at 3 p.m., at the Engineers' Club, Manchester. The public business will begin at 3.45 p.m., the subject for discussion being "Toxic Substances in Industry," opened by Dr. S. A. Henry. Dr. M. W. Goldblatt will discuss the hazards of the chemical industry, Dr. A. J. Amor those of the welding industry, and Dr. A. L. Leigh Silver various health problems in filling factories. The discussion will be followed by a dinner at the Engineers' Club at 6.15 p.m.

Because of the frequency with which hospitals are bombed from the air, a fleet of twenty-five mobile *x*-ray plants, each capable of the most urgent work of a hospital radiographic department, is being built by the War Organization of the British Red Cross. Generally speaking, these units are built to the Society's design—a design which has stood the test of experience over a long period of time. They will be posted, in collaboration with the Ministry of Health, throughout the country, in districts where the Ministry thinks they will serve a useful purpose. All the usual accessories are housed in the vans, and the units are self-contained, being built to generate their own power.

The board of management and the medical staff of the Hospital for Sick Children, Great Ormond Street, are anxious to offer medical men and women from over-seas the opportunity of visiting the hospital during their stay in this country. The hospital block, the second section of the rebuilding scheme, was completed just before the war, and contains many interesting features in design and equipment, the product of the experience of the medical, nursing, and lay staff during the past quarter of a century. Doctors and nurses now in England, particularly those interested in the treatment and care of sick children, will be welcomed.

The Bombay Medical Council at a meeting last September resolved that "in the absence of a common Indian language medical education of the Western type should for the time being be imparted through English as is done at present." Reference was made to the impending retirement of General Buckley, who has been President of the Council for nearly four years, and a unanimous resolution was passed expressing appreciation of the valuable services he has rendered to the profession, and particularly to the Council, during that period.

The Royal Northern Hospital, Holloway, has received, through Mrs. Wales Latham of New York and Mrs. Edward Murrow of London, 30,000 dollars for six months' maintenance of the operating theatres and *x*-ray department. The gift has been received with this message: "Delighted that 'Bundles for Britain' and its 800 branches can share in your courageous work through the sympathy and generosity of the American people."

The New South Wales Health Department proposes to appoint at least 10,000 residents, both male and female, between the ages of 18 and 60, to participate in a blood transfusion scheme to provide a twenty-four-hour service of blood donors to hospitals and a supply of blood for transfusions in any emergency.

No. 7

INFECTIOUS DISEASES AND VITAL STATISTICS

We print below a summary of Infectious Diseases and Vital Statistics in the British Isles during the week ended February 15, 1941.

Figures of Principal Notifiable Diseases for the week and those for the corresponding week last year, for: (a) England and Wales (London included). (b) London (administrative county). (c) Scotland. (d) Eire. (e) Northern Ireland.

Figures of Births and Deaths, and of Deaths recorded under each infectious disease, are for: (a) The 126 great towns in England and Wales (including London). (b) London (administrative county). (c) The 16 principal towns in Scotland. (d) The 13 principal towns in Eire. (e) The 10 principal towns in Northern Ireland.

A dash — denotes no cases; a blank space denotes disease not notifiable or no return available.

Disease	1941					1940 (Corresponding Week)				
	(a)	(b)	(c)	(d)	(e)	(a)	(b)	(c)	(d)	(e)
Cerebrospinal fever	378	26	81	2	7	560	28	114	1	5
Deaths		7	7				4	10		
Diphtheria	1,175	50	343	18	32	655	28	209	55	34
Deaths	46	1	13	2	1	20	1	11	1	1
Dysentery	174	11	30		—	61	2	28		—
Deaths			—	—	—			—	—	—
Encephalitis lethargica, acute	6	1	—		—	14	—	1		—
Deaths		—	—				—	—		
Enteric (typhoid and paratyphoid) fever	18	2	1	4	1	13	2	2	5	4
Deaths	2	—	1	—	—	3	—	—	—	1
Erysipelas			65	4	2			48	5	5
Deaths		—	—	—	—		—	—	—	—
Infective enteritis or diarrhoea under 2 years	—	—				—	—			
Deaths	36	1	5	1	3	43	6	10	4	6
Measles	16,654	387	177		18	4,055	46	55		316
Deaths	26	5	3	—	—	14	—	2	—	14
Ophthalmia neonatorum	62	3	20		1	72	10	18		—
Deaths					—					
Pneumonia, influenzal	2,106*	162	46	9	18	2,074	100	139	9	13
Deaths (from influenza)	324	50	24	4	5	521	47	86	11	15
Pneumonia, primary			411	15				492	15	
Deaths		130		19	18		96		23	40
Polio-encephalitis, acute	2	—				1	—			
Deaths		—					—			
Poliomyelitis, acute	12	1	—		—	4	—	3		—
Deaths	—	—	—				—	—		
Puerperal fever	1	1	6	—	2	2	2	6	3	1
Deaths		—					1			
Puerperal pyrexia	199	10	14		1	151	15	27		—
Deaths										
Relapsing fever	—	—			2	—	—			—
Deaths										
Scarlet fever	1,198	63	164	60	28	1,019	44	113	56	61
Deaths	3	—	1	—	—	6	—	1	—	—
Small-pox	—	—	—	—	—	—	—	—	—	—
Deaths	—	—	—	—	—	—	—	—	—	—
Typhus fever	—	—	—	—	—	—	—	—	—	—
Deaths			—	—	—			—	—	—
Whooping-cough	3,425	39	495		21	509	12	36		13
Deaths	38	3	17	1	—	5	—	1	—	2
Deaths (0-1 year)	469	36	86	37	24	578	73	115	52	32
Infant mortality rate (per 1,000 live births)										
Deaths (excluding stillbirths)	7,734	1,330	912	243	208	8,807	1,299	1,186	298	314
Annual death rate (per 1,000 persons living)			19.9	16.1	18.2			22.7	19.9	27.6
Live births	5,416	386	899	318	226	6,226	893	917	279	247
Annual rate per 1,000 persons living			18.2	21.1	19.8			18.6	18.6	21.7
Stillbirths	213	21	42			258	31	35		
Rate per 1,000 total births (including stillborn)			45					37		

* Includes primary form in figures for England and Wales, London (administrative county), and Northern Ireland.

EPIDEMIOLOGICAL NOTES

Infectious Diseases for the Week

Measles, whooping-cough, diphtheria, pneumonia, cerebrospinal fever, and dysentery have increased in incidence during the week. In Scotland notifications remained at approximately the same level, with the exception of whooping-cough, which showed an appreciable increase although deaths were fewer.

Cerebrospinal Fever

Cerebrospinal fever has appeared in fewer localities than last year—approximately two-thirds of the administrative health areas as against nearly five-sixths in the corresponding week of last year. Except for the highly industrialized centres of Lancashire and the West Riding of Yorkshire, local prevalences have nowhere reached the dignity of epidemics. The chief centres of the disease at present are Lancashire 57; West Riding of Yorkshire 28; London 26; Middlesex and Warwick 17 each; Chester 16; Glamorgan 15; Durham, Essex, and Surrey 14 each; Southampton 13; Stafford 11; Devon 10. Notifications for the week ending March 1 numbered 400. In Scotland just under one-half of the counties and burghs are affected, notably the counties of Dumfries 4; Ayr, Fife, and Lanark 3 each; and the burghs of Glasgow 25, Edinburgh 12, Ayr and Rutherglen 3 each.

Dysentery

Although the incidence of dysentery has been mounting in recent weeks it remains a comparatively infrequent disease, and at present has appeared in only fifteen of the administrative areas, three of which account for over three-fifths of the total, while only single cases were recorded in no more than a third of the areas. It is probable that the notified cases are an underestimate of the real incidence of the disease, as single cases of the prevailing mild Sonne type are readily overlooked. The areas chiefly affected were Lancaster 49, Essex 28, Bedford 27, London 11, Northampton 10, Kent 6. In Scotland the notifications were: Fife 3, Argyll 2, Dumbarton and Stirling 1 each, and in the burghs of Edinburgh 9, Aberdeen 5, Dundee and Glasgow 4 each, Paisley 1.

Influenza for Week Ending March 1

In the week ended March 1 267 deaths were ascribed to influenza in the great towns, 47 fewer than in the previous week. The age distribution continues to be normal: 3.7% only of the deaths were at ages under 25 and 55.8% at ages over 65. In the County of London the deaths have decreased from 26 to 20. The proportion of total deaths coming from the South-Eastern Area remains almost the same as last week—35.5%. This is the second week of decline in total mortality, and it is now improbable that this winter's experience will be as bad as that of 1940, when the epidemic was not very severe.

Total of Influenza Deaths and Deaths in Age Groups in 126 Great Towns for Week Ending March 1

All Ages	A Under 1 year	B 1-5	C 5-15	D 15-25	E 25-35	F 35-45	G 45-55	H 55-65	I 65-75	J 75 and over
267	8	—	2	11	6	14	34	43	70	79

Regional Totals of Influenza Deaths for Week Ending March 1

South-Eastern Area:			Midland Area	54
Greater London	79		Eastern Area	5
Rest of S.E.	16	= 95	South-Western Area	7
Northern Area		108	Wales and Monmouthshire	14
			Total for 126 Great Towns, including the Outer Ring	283

As the appeal of the Spanish Government for general vaccination has had little effect, the following method has been employed. Food cards will in future only be given on presentation of a vaccination certificate, and a vaccination department will be established close to the office for distribution of food cards where vaccination can be performed gratuitously.

Letters, Notes, and Answers

All communications in regard to editorial business should be addressed to THE EDITOR, BRITISH MEDICAL JOURNAL, B.M.A. HOUSE, TAVISTOCK SQUARE, W.C.1.

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QUERIES AND ANSWERS

Wild Plants as Sources of Vitamin C

Dr. W. J. BURNS SELKIRK (Birmingham) asks whether there is any objection to recommending the young leaves of the hawthorn for eating in place of fresh vegetables this year. He writes: Nasturtium leaves, I believe, can be eaten freely "as salad" component. It would also be interesting if you could publish from some Finnish source the recipe for making a conserve of wild rose hips, which, I understand, the Finns make and use through the winter, the hips being very rich in vitamin C. What book would you recommend dealing with the use of wild herbs? No doubt past generations of country folk were in the habit of using various herbs in the spring after winter deprivation of sources of vitamin C. The field dandelion, as used in salads by the French peasants, is one at least.

Coley's Fluid

Dr. W. R. STEPHEN (Lodge, near Wrexham) writes: Can Coley's fluid be used while the patient is still at work or in such a manner that he is off work as little as possible? I should be grateful for any advice.

Intestinal Flatulence in the Aged

"R. S." writes: I should be grateful for suggestions about the treatment of a case of intestinal flatulence, distressing to the patient. Liquid paraffin and pil. alophen have been prescribed to regulate the bowels, and carminatives have been administered. The patient is 78 years of age and of active habits.

Dysmenorrhoea

Mr. A. J. HOBSON, F.R.C.S. (Wimbledon, S.W.20), writes: I would like to reply to Dr. D. C. Miln (February 22, p. 304) under the headings he suggests. (1) The mixture should be commenced about a week before the period is expected and continued through the period itself. (2) I have to confess that the cases in which I have tried out this mixture have been chiefly among my friends and relatives, people whose intake of vitamin D is probably adequate. In these cases I have been extremely satisfied with the success of the prescription. In my hospital work, dealing with patients of a less sufficient dietary level and chiefly cases of delayed bony union, I give vitamin D and rely on injections of calcium Sandoz. (3) The rapid benefit I have obtained in cases of really bad chilblains would appear to show a very definite effect on vascular permeability. As to expense, I have no experience at all with national health insurance practice, but as I have yet to find calcium tablets of any use, I think that if more extended use of the mixture I put forward proves its value then a good case could be made out for its employment. Finally, I have always wondered why some young biochemist does not fully investigate calcium balance—intake and excretion—under different diets and treatments.

Dr. GEORGE HALL (Montreal) writes: When gynaecological findings were negative I have used the following recipe over a period of twenty-five years with very pleasing results—namely, saturated solution of pot. iodid. in aqua chlorof., ℥v, t.i.d., p.c., for two or three months. Tribute is paid to this treatment in his book *The Horse and Buggy Doctor*, by Dr. Arthur E. Hertzler, published by Harper Bros., London and New York. I am of the opinion that the majority of cases are psychological, but pot. iodid. will do the trick.

Treatment of Herpes

Dr. RANDAL A. STEWART (Hampstead, N.W.3) writes: With regard to the treatment of herpes, I have found the old A.C.M. lotion, when swabbed over the lesions three to four times daily, to be particularly effective in drying up the lesion and also in preventing a secondary impetigo. The formula is:

℞ Acetone .. .. ʒij
Cyllin .. .. ℥xlviij
Sp. vin. meth .. .. ad ʒv

The only disadvantage is that the application is rather painful when applied over large areas. It is very valuable in herpes labialis. The lotion is an excellent one in the preparation of the skin for surgical operations. The acetone has the effect of dissolving grease, thus allowing the disinfectant to act.

LETTERS, NOTES, ETC.

Scabies

Dr. E. A. WELSH (Felton, Morpeth) writes: I was very pleased to see the letter by a practising dermatologist on the subject of scabies. I have seen more of this condition during the past year than in the previous eighteen years I have been in practice. It may not be an infectious disease in the accepted sense, but in the ordinary sense it is the most infectious disease I know. Measles and whooping-cough are now notifiable, and their treatment is easy as compared to scabies. If it continues to increase at its present rate there will soon be few of us not in need of treatment. The impossibility of efficient treatment under adverse conditions and when a whole household has become thoroughly infested is such that some active interest is called for from the public health services.

Green Vegetables

"G. E." writes: As a doctor's wife who reads the *B.M.J.* even more methodically than he himself, may I state that in my opinion your correspondents have not looked at the above question from the woman's point of view. The suggested lower price of vegetables would not popularize them with the poorer members of the community. Even were they to be given away there is so much time and labour involved in cleaning and preparing them that the working-class woman is prejudiced from the start. In homes where a servant is kept there is usually no lack of properly cleaned and cooked green vegetables at mealtimes, but the poorer housewife is not paid a wage for this "drudgery." Working-class children would receive ample supplies of these vital foodstuffs were it possible to obtain them in tins, or even packed ready cooked, like fish and chips, in newspapers!

Tourniquet for First Aid

Dr. THOMAS G. OSLER (Watford) writes: I wish to endorse the recent note in your *Journal* (February 15, p. 262) by Captain Farris, R.A.M.C., on a first-aid tourniquet made from strips cut out of discarded motor-car inner tubes, and am interested to note the good results he records. I have recommended for use a similar tourniquet in the Watford Borough A.R.P. casualty services, my pattern being 2 inches broad by 3 feet or 4 feet long, the different lengths being for the upper or the lower limbs respectively. These lengths give the advantage of obtaining obliteration by the pressure of several firmly applied turns as opposed to one or two very tight ones, and this also is an advantage in the gradual loosening of the tourniquet. Two tapes are fastened on to one end and are used for fixing the tourniquet on the limb; a small rubber loop is attached to the other end and serves to hold the tourniquet in a neat rolled-up position ready for immediate use.

Zinc Peroxide for War Wounds

Dr. W. J. BURNS SELKIRK writes with reference to the annotation on this subject (February 2, p. 285): I had a case of cancer of the mouth and pharynx, sloughy, foul, and fetid. The patient refused surgical treatment and I gave him large doses of pot. chlorate. The cancer became clean, lost its fetor, and the patient lost the foul taste from it. Otherwise, of course, the case progressed to a fatal termination.

Corrigendum

Dr. D. FITZGERALD MOORE writes: In my letter (December 14, 1940, p. 848) on nutritional disturbances and optic atrophy the reference to T. Moore in relation to animal experiments and optic atrophy should read L. A. Moore (U.S.A.). I also made the statement that manioc is fairly rich in riboflavin. It is, however, possible that processed manioc such as gari, in common use as a local food, may show a much lessened riboflavin content. It is hoped to get more definite information on this point in due course.